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Chemical and Spectrochemical Analyses of Illinois Clay Materials

Compiled by W. Arthur White

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CHEMICAL AND SPECTROCHEMICAL ANALYSES OF ILLINOIS CLAY MATERIALS

Compiled by W. Arthur White

ABSTRACT

This report brings together all the published and unpublished chemical and spectrochemical analyses that are available for Illinois clay materials. Deposits analyzed include both active and abandoned pits and mines as well as some deposits that never have been worked and for which no chemical and mineralogical data have been available.

The tables of chemical composition should aid in planning the commercial development of current or new operations and in extending the use of clay materials.

INTRODUCTION

Chemical analyses of Illinois clay materials have appeared in a number of publications, many of which are out of print; in addition, many unpublished analyses are on file at the Illinois State Geological Survey. The chemical analyses presented herein (table 1) were compiled in order to consolidate all the available analyses into one report. Spectrochemical analyses (table 2) were added to complete this report.

The tables show the chemical composition of many deposits and should suggest their suitability for use in both known and new products. Some of the analyses are of clays from active or abandoned pits and mines; others are of clays from road cuts and outcrops that may contain deposits that may be of commercial use in the future.

Table 1 contains a list of references to published data from which additional information may be obtained. Brief descriptions of the deposits sampled for the unpublished data are included in this report, as are the sources of this information.

The clay mineral data on the samples reported herein are determined from the clay fraction which is a less than 1 micron fraction of the sample. The quartz reported in the clay mineral data is less than 1 micron in size. The quartz and clay minerals are reported in parts in 10, that is, quartz <1 means that there is less than 1 part of quartz in 10.

CLAY DEPOSITS ANALYZED

Alexander County

- 1423 NW $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 21, T. 15 S., R. 3 W. About 1 $\frac{1}{2}$ miles south of Thebes along Mississippi River bluff, east side of Missouri Pacific Railroad, back of farmhouse. Blue-gray clay of Eocene age, 6 to 8 feet exposed; overburden may vary from 0 to 30 feet. The clay less than one micron contains quartz 1 part, kaolinite 5 parts, and illite 4 parts. Sample collector, W. A. White, 1957. Clay mineral data, W. F. Bradley. Chemical analysis, L. D. McVicker, 1958.
- 1424 SE $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 28, T. 15 S., R. 3 W. About 1 mile north of Fayville in hollow. About 20 feet of dark gray, well laminated shale exposed on north cut bank of ravine in east bluff of Mississippi River about 1/8 mile east of Missouri Pacific Railroad. The hollow contains remains of old abandoned powder plant. Sample represents top 20 feet of Orchard Creek Shale. The clay less than 1 micron is quartz 1 part, illite 4 parts, chlorite 2 parts, and limonite. Sample collector, W. A. White, 1957. Clay mineral data, W. F. Bradley, 1958. Chemical analysis, L. D. McVicker, 1958.
- DS7 NW $\frac{1}{4}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 28, T. 15 S., R. 3 W. Hollow farthest north on powder company property. Under Missouri Pacific Railroad and 500 feet from C. and E. I. Railroad. The Orchard Creek Shale is dark gray to blackish brown, somewhat calcareous, well bedded in layers $\frac{1}{2}$ to 1 $\frac{1}{2}$ inches thick. Locally shale nodules are present. Weathers gray and splits into thin flakes. Collectors, C. E. Dutton and H. W. Scott, 1931. Chemical analysis, L. D. McVicker.

Bond County

- 1415 NE $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 13, T. 6 N., R. 5 W. Richards Brick Company pit. About 3 miles east of New Douglas, south side of blacktop road. Exposure includes: Illinoian till, \pm 5 feet; shale of the Bunje Cyclothem, yellow, plastic, \pm 6 feet; shale, blue, not as plastic, 8 feet. The clay fraction less than 1 micron is illite 4 parts, kaolinite 3 parts, and chlorite 3 parts. Collector, W. A. White, 1957. Clay mineral data, W. F. Bradley. Chemical analysis, L. D. McVicker, 1958.
- 1530A Same location as 1415. Sample of partially weathered gray shale of Bunje Cyclothem is from lower 7 feet of shale near north end of pit. Collector, W. A. White, 1959. Chemical analysis, L. D. McVicker, 1959.
- 1530B Same location as 1530A except 7 to 19 feet above bottom of pit, shale of Bunje Cyclothem, buff and weathered. Collector, W. A. White, 1959. Chemical analysis, L. D. McVicker, 1959.
- 1530C Same location as 1530A except 4 feet of weathered Illinoian till above shale of Bunje Cyclothem. Collector W. A. White, 1959. Chemical analysis, L. D. McVicker, 1959.
- 1530D Same location as 1415 except lower 5 feet of gray shale of Bunje Cyclothem, slightly weathered. Collector W. A. White, 1959. Chemical analysis, L. D. McVicker, 1959.
- 1530E Same location as 1530D except 6 feet of gray shale of Bunje Cyclothem 10 to 16 feet above bottom, partially weathered. Collector, W. A. White, 1959. Chemical analysis, L. D. McVicker, 1959.

- 1530F Same location as 1530D except 6 feet of buff, weathered shale of Bunje Cyclothem, 16 to 22 feet above bottom of pit. Collector, W. A. White, 1959. Chemical analysis, L. D. McVicker, 1959.
- 1530G Same location as 1415 except 6 feet of gray shale from Bunje Cyclothem was collected at bottom of pit, partially weathered. Collector, W. A. White, 1959. Chemical analysis, L. D. McVicker, 1959.
- 1530H Same location as 1530D except weathered Illinoian till 5 feet thick over shale of Bunje Cyclothem. Collector, W. A. White, 1959. Chemical analysis, L. D. McVicker, 1959.

Brown County

- 1337A SE $\frac{1}{4}$ SE $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 24, T. 1 S., R. 4 W. North shale pit of Frederic Brick and Tile Company north of gravel road in west cut bank of Dry Fork Creek. Bottom 10 feet of exposure blue shale, probably middle of Purington Shale. The clay mineralogy for the less than 1 micron fraction is quartz <1 part, kaolinite <1 part, swelling chlorite 2 parts, chlorite 2 parts, swelling illite 1 part, and illite 3 parts. Collector, W. A. White, 1956. Clay mineral data, W. F. Bradley, 1958. Chemical analysis, L. D. McVicker, 1958.
- 1337B Same location as 1337A except top 10 feet of Purington Shale, weathered yellow-gray. Collector, W. A. White, 1956. Chemical analysis, L. D. McVicker, 1958.
- 1351 SW $\frac{1}{4}$ SW $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 8, T. 1 S., R. 3 W. About $\frac{1}{4}$ mile north of Mt. Sterling on east side of Illinois Highway 99 on south cut bank of stream east of highway fence. Underclay below limestone, 5 feet, noncalcareous (the underclay of No. 4 Coal), grades from a dark plastic clay at top into sandstone or sandy shale at bottom. Collector, W. A. White, 1956. Chemical analysis, L. D. McVicker, 1957.

Bureau County

- 1404 NW $\frac{1}{4}$ SW $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 24, T. 16 N., R. 6 E. Sheffield Shale Products Company pit west of Sheffield, south of U. S. Route 6. The Sheffield Shale is gray and rather blocky, about 15 to 20 feet thick. Overburden is thin. The clay mineralogy of the less than 1 micron fraction is quartz 1 part, kaolinite 3 parts, chlorite 2 to 3 parts, and illite 3 to 4 parts. Collectors, W. A. White and W. E. Parham, 1957. Clay mineral data, W. F. Bradley, 1958. Chemical analysis, L. D. McVicker, 1958.

Calhoun County

- DS38 NE $\frac{1}{4}$ NW $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 15, T. 10 S., R. 2 W. About $1\frac{3}{4}$ miles north of Hardin. Upper green shale of Hannibal Shale. Collectors, C. E. Dutton and H. W. Scott, 1931. Chemical analysis, L. D. McVicker, 1940.
- R104 NW $\frac{1}{4}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 3, T. 9 S., R. 2 W. South cut bank of Kampsville Creek about $\frac{1}{2}$ mile west of Kampsville. Sample represents 11 feet of a 31-foot exposure of the Hannibal Shale. Collector, T. B. Root, 1929. Chemical data, O. W. Rees, 1933.
- 1349A NE $\frac{1}{4}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 11, T. 9 S., R. 3 W. Southwest of paved road, southwest cut bank of tributary to Fox Creek behind farm buildings, about 5 miles west

of Kampsville. Sample of Hannibal Shale represents lower 15 feet of blue-gray shale in exposure. The clay mineralogy of the less than 1 micron fraction of the shale is chlorite 3 parts, swelling illite 1 part, illite 5 parts, and trace of CaCO_3 . Collector, W. A. White, 1956. Clay mineral data, W. F. Bradley, 1958. Chemical analysis, L. D. McVicker, 1957.

- 1352A SW $\frac{1}{4}$ NE $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 17, T. 11 S., R. 2 W. About 5 miles north of Batchtown on west side of road in east bluff of Mississippi River Valley. Sample represents middle 20 feet of exposed Maquoketa Shale, which is bluish gray and weathers into fairly thin laminae. The shale contains very little CaCO_3 , if any. The clay mineralogy is chlorite 2 parts and illite 7 parts. Collector, W. A. White, 1956. Clay mineral data, W. F. Bradley, 1958. Chemical analysis, L. D. McVicker, 1957.
- 1532 NE $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 32, T. 11 S., R. 2 W. Northeast side of road in east valley wall of Mississippi River, about 100 yards down slope west of house. About 20 feet of Wisconsin age loess is exposed. Collector, W. A. White, 1959. Chemical analysis, L. D. McVicker, 1959.

Cass County

- P99 Center E line, sec. 11, T. 18 N., R. 11 W. About 6 $\frac{1}{2}$ miles east of Beardstown. Lower 5 feet of gray silt. Wisconsin loess. Collectors, J. C. Frye and H. B. Willman, 1958. Chemical analysis, L. D. McVicker, 1959.
- P101 Same location as P99 except 5 to 13 feet above base. Wisconsin loess. Collectors, J. C. Frye and H. B. Willman, 1958. Chemical analysis, L. D. McVicker, 1959.
- P103 Same location as P99 except 13 to 23 feet above base. Wisconsin loess. Collectors, J. C. Frye and H. B. Willman, 1958. Chemical analysis, L. D. McVicker, 1959.
- P105 Same location as P99 except 23 to 38 feet above base. Wisconsin loess. Collectors, J. C. Frye and H. B. Willman, 1958. Chemical analysis, L. D. McVicker, 1959.
- P108 Same location as P99 except top 15 feet. Wisconsin loess. Collectors, J. C. Frye and H. B. Willman, 1958. Chemical analysis, L. D. McVicker, 1959.

Christian County

- 1428 SE $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 33, T. 11 N., R. 1 E. About 1 $\frac{1}{2}$ miles south of Pana, in north cut bank of ravine about 100 yards west of U. S. Highway 51. Exposure consists of about 8 feet of weathered gray shale of McLeansboro Group above Millersville Limestone. Overburden is relatively thin. The clay mineralogy of the less than 1 micron fraction is kaolinite 2 parts, chlorite 2 parts, swelling illite 2 parts, and illite 2 parts. Collectors, W. A. White and W. E. Parham, 1957. Clay mineral data, W. F. Bradley, 1958. Chemical analysis, L. D. McVicker, 1958.

Clark County

- 1345 NE $\frac{1}{4}$ NE $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 16, T. 11 N., R. 11 W. About 2 $\frac{1}{2}$ miles east of Marshall and about 1 mile south of Livingston. About 15 feet of a shale of the McLeansboro

Group between Shoal Creek and Millersville Limestones is exposed in the southwest cut bank of Big Creek. The shale is dark gray and well laminated. Overburden is about 50 feet. The mineralogy of the clay fraction is quartz <1 part, kaolinite 1 to 2 parts, chlorite 2 parts, swelling chlorite 2 parts, swelling illite 1 part, and illite 3 parts. Collector, W. A. White, 1957. Clay mineral data, W. F. Bradley, 1958. Chemical analysis, L. D. McVicker, 1958.

Clay County

1420 SE $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 19, T. 4 N., R. 6 E. About 3 $\frac{1}{2}$ miles west of Louisville. About 3 feet of shale exposed in road ditch west of farmhouse. A shale of the upper part of the McLeansboro Group, weathered brownish gray, $\frac{1}{4}$ -inch laminae. Overburden thin. Clay mineralogy of clay fraction is kaolinite 3 parts, chlorite 1 part, swelling illite 1 part, and illite 5 parts. Collectors, W. A. White and W. E. Parham, 1957. Clay mineral data, W. F. Bradley, 1958. Chemical analysis, L. D. McVicker, 1958.

Clinton County

1414 SW $\frac{1}{4}$ sec. 1, T. 1 N., R. 1 W. About 1 $\frac{1}{2}$ miles northwest of Centralia in south cut bank of Crooked Creek east of bridge, 8 feet of shale of Sorento? Cyclothem is exposed. The bottom of the shale lies on a fossiliferous limestone which is 3 feet above water level during summer season. At the outcrop sand and gravel overlies the shale. The clay mineral data is quartz <1 part, kaolinite 2 parts, chlorite 1 part, swelling chlorite 1 to 2 parts, swelling illite 2 parts, illite 2 parts, and limonite. Collectors, W. A. White and W. E. Parham, 1957. Clay mineral data, W. F. Bradley, 1958. Chemical analysis, L. D. McVicker, 1958.

Crawford County

1421 SW $\frac{1}{4}$ SW $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 1, T. 5 N., R. 12 W. About $\frac{3}{4}$ mile west of Flat Rock. In west bank of ravine inside fence north of bridge, west of farmhouse, 3 feet of a gray shale of the McLeansboro Group above the Livingston Limestone is exposed. The overburden would be thin in this area. The clay fraction is quartz <1 part, kaolinite 1 to 2 parts, chlorite 2 parts, swelling illite 2 parts, and illite 3 parts. Collectors, W. A. White and W. E. Parham, 1957. Clay mineral data, W. F. Bradley, 1958. Chemical analysis, L. D. McVicker, 1958.

Cumberland County

1353A NE $\frac{1}{4}$ NW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 36, T. 10 N., R. 9 E. About 1 mile north of Greenup, 10 feet of dark gray shale in cyclothem below Greenup Cyclothem, in south cut bank of Bell Creek about 50 yards west of old road west of Illinois Highway 130. The clay mineral data are kaolinite 1 part, chlorite 1 part, swelling chlorite some, swelling illite 4 parts, illite 2 parts, and soluble salts. Collector, W. A. White, 1956. Clay mineral data, W. F. Bradley, 1958. Chemical analysis, L. D. McVicker, 1957.

1346A NW $\frac{1}{4}$ NW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 2, T. 9 N., R. 9 E. Northwest corner of Greenup. Northeast roadside cut along Illinois Highway 121 in south bluff of Embarrass River. Lower 10 feet of shale in cyclothem below Greenup Cyclothem is sandier than 1353A and is stratigraphically lower in shale section. Shale in this area is from 20 to 30 feet thick. The clay mineral data are kaolinite 1 part, chlorite

1 part, swelling illite 2 parts, illite 4 parts, and soluble salts. Collector, W. A. White, 1956. Clay mineral data, W. F. Bradley, 1958. Chemical analysis, L. D. McVicker, 1957.

Edwards County

1326A NE $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 11, T. 2 S., R. 10 E. Pit of Albion Brick Company south of Albion, \pm 20 feet of shale in the upper part of the McLeansboro Group is exposed. The clay mineral data are quartz 1 part, kaolinite 2 parts, chlorite 2 parts, swelling illite 1 part, and illite 4 parts. Collector, W. A. White, 1956. Clay mineral data, W. F. Bradley, 1958. Chemical analysis, L. D. McVicker, 1957.

Effingham County

1416 NW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 1, T. 6 N., R. 5 E. About 4 miles northeast of Mason on north side of Illinois Highway 37 about 100 yards west of Illinois Central Railroad. About 4 feet of shale in the upper part of the McLeansboro Group is exposed in road cut. Overburden is shallow. The clay mineral data are kaolinite <1 part, chlorite 2 to 3 parts, swelling illite 1 part, and illite 3 parts. Collectors, W. A. White and W. E. Parham, 1957. Clay mineral data, W. F. Bradley, 1958. Chemical analysis, L. D. McVicker, 1958.

E1 SW $\frac{1}{4}$ SW $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 6, T. 7 N., R. 6 E. Along north cut bank of ditch on north side of road north of house on south side of road. Illinoian till, upper 6 inches. Collector, M. M. Leighton, 1955. Chemical analysis, L. D. McVicker, 1956.

E2 Same as E1 except 11 to 12 inches below top.

E3 Same as E1 except 18 to 21 inches below top.

E4 Same as E1 except 32 to 35 inches below top.

E5 Same as E1 except 45 to 48 inches below top.

E6 Same as E1 except 51 to 54 inches below top.

E7 Same as E1 except 60 to 63 inches below top.

E8 Same as E1 except 72 to 77 inches below top.

E9 Same as E1 except 82 to 87 inches below top.

E10 Same as E1 except 95 to 99 inches below top.

E11 Same as E1 except 106 to 111 inches below top.

E12 Same as E1 except 116 to 120 inches below top.

E13 Same as E1 except 134 to 137 inches below top.

E14 Same as E1 except 148 to 152 inches below top.

E15 Same as E1 except 162 to 166 inches below top.

E16 Same as E1 except 172 to 175 inches below top.

E17 Same as E1 except 214 to 218 inches below top.

Fayette County

- 1427 NE $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 28, T. 7 N., R. 3 E. About $\frac{1}{4}$ mile west of St. Elmo, north of Pennsylvania Railroad and south of county road. Sample represents about 20 feet of dark blue shale in the upper part of the McLeansboro Group which contains siderite concretions in pit west of plant. The clay mineralogy is quartz <1 part, kaolinite 2 parts, chlorite 2 parts, swelling illite 2 parts, illite 2 parts, and limonite. Collectors, W. A. White and W. E. Parham, 1957. Clay mineral data, W. F. Bradley, 1958. Chemical analysis, L. D. McVicker, 1958.
- V1 SW $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 20, T. 6 N., R. 1 E. Along west wall of gravel pit east of road, 3 to 6 inches from top. Collector, M. M. Leighton, 1955. Chemical analysis, L. D. McVicker, 1956.
- V2 Same as V1 except 8 to 12 inches below top.
- V3 Same as V1 except 23 to 27 inches below top.
- V4 Same as V1 except 31 to 37 inches below top.
- V5 Same as V1 except 40 to 44 inches below top.
- V6 Same as V1 except 44 to 47 inches below top.
- V7 Same as V1 except 55 to 59 inches below top.
- V9 Same as V1 except 78 to 82 inches below top.
- V11 Same as V1 except 106 to 110 inches below top.
- V12 Same as V1 except 121 to 126 inches below top.
- V14 Same as V1 except 157 to 166 inches below top.
- V15 Same as V1 except 180 to 196 inches below top.
- V16 Same as V1 except 208 to 220 inches below top.

(All of the V series of samples are of Pleistocene age. V1 to V3 are Peorian loess, V4 is Farmdale loess, and V5 to V16 are Illinoian gravel.)

Fulton County

- 217 SE $\frac{1}{4}$ sec. 21, T. 6 N., R. 3 E. One mile east of Cuba. Light gray Canton Shale over No. 5 Coal, slightly bedded. Collector, R. E. Grim, 1932. Chemical data, O. W. Rees, 1933.
- 1322A Sec. 7, T. 5 N., R. 5 E. Pine Ridge Coal Company pit. The buff Canton Shale is mined; sample was taken from shale bin of Peoria Brick and Tile Company. The clay mineral data are quartz 1 part, kaolinite 1 part, chlorite 2 parts, swelling chlorite 2 parts, illite 3 parts, and limonite. Collector, W. A. White, 1956. Clay mineral data, W. F. Bradley, 1958. Chemical analysis, L. D. McVicker, 1958.
- 1350A Truax Coal Corporation pit southeast of Fiatt, about 40 feet of Canton Shale, blue-gray, overburden 15 to 20 feet. The clay mineral data are kaolinite 1 part,

swelling chlorite ?, swelling illite 1 part, illite 3 parts, and siderite. Collector, W. A. White, 1956. Clay mineral data, W. F. Bradley, 1958. Chemical analysis, L. D. McVicker, 1957.

- 1531 NE $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 36, T. 6 N., R. 3 E. Morgan Coal Company pit near Bryant. Upper foot of gray underclay below No. 5 Coal. Collector, W. A. White, 1959. Chemical analysis, L. D. McVicker, 1959.

Greene County

- R106 NW $\frac{1}{4}$ NE $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 2, T. 10 N., R. 13 W. Near Bluffdale, 2 feet of clay exposed. Collector, T. B. Root. Chemical data, O. W. Rees, 1933.

- 1355A SE $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 30, T. 12 N., R. 11 W. Two and a half miles northeast of White Hall, 15 feet of Purington Shale, brownish yellow, weathered, overburden 15 to 20 feet. The clay mineral data are quartz 1 to 2 parts, kaolinite 1 part, chlorite 3 parts, and illite 4 parts. Collector, W. A. White, 1956. Clay mineral data, W. F. Bradley, 1958. Chemical analysis, L. D. McVicker, 1958.

Grundy County

- 212 NW $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 11, T. 33 N., R. 8 E. Seven miles east of Morris. Illinois Clay Products Company pit. Lower 15 feet of clay in Tradewater Group in pit below 6-inch coal. Collector, R. E. Grim, 1932. Chemical data, O. W. Rees, 1933.

- CFF NW $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 11, T. 33 N., R. 8 E. Seven miles east of Morris. Illinois Clay Products Company pit. Sample of fireclay in Tradewater Group. Analysis requested by C. F. Fryling. Chemical data, O. W. Rees, 1932.

- W119a NW $\frac{1}{4}$ NE $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 11, T. 33 N., R. 8 E. Seven miles east of Morris. Illinois Clay Products Company pit. Two feet of Maquoketa Shale exposed. Collector, H. B. Willman. Chemical data, O. W. Rees.

- 1401 SW $\frac{1}{4}$ sec. 11, T. 33 N., R. 6 E. Morris Clay Company pit about 4 miles southwest of Morris. Upper 20 feet of the Francis Creek Shale, brownish gray and sandy. Overburden is thin. The clay mineral data are kaolinite 2 parts, chlorite 2 to 3 parts, and illite 5 to 6 parts. Collector, W. A. White, 1957. Clay mineral data, W. F. Bradley, 1958. Chemical analysis, L. D. McVicker, 1958.

- 1331A SW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 12, T. 31 N., R. 8 E. East of East Brooklyn, pit of Northern Illinois Coal Corporation. Farmington Shale, blue-gray, upper 5 feet above No. 7 Coal, about 18 feet of overburden. The clay mineral data are quartz 1 part, kaolinite 3 to 4 parts, swelling illite 1 part, and illite 4 to 5 parts. Collector, W. A. White, 1956. Clay mineral data, W. F. Bradley, 1958. Chemical analysis, L. D. McVicker, 1957.

- 1331B Location same as 1331A. Siltstone, blue-gray, 5 feet, and clay 5 feet above Farmington Shale, overburden about 8 feet. The clay mineral data are quartz <1 part, chlorite 2 parts, swelling chlorite and swelling illite 4 parts, and illite 2 parts. Collector, W. A. White, 1956. Clay mineral data, W. F. Bradley, 1958. Chemical analysis, L. D. McVicker, 1957.

- 1331F Same location as 1331A. Farmington Shale, blue-gray, 5 feet below 1331A. Collector, W. A. White, 1956. Chemical analysis, L. D. McVicker, 1957.

Hancock County

- 1408 SW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 26, T. 3 N., R. 5 W. Southeast bank of Williams Creek about 200 yards southeast of Augusta-Clayton road about 2 miles south of Augusta. Francis Creek Shale, gray, about 30 feet exposed, about 30 feet of overburden. The clay mineral data are quartz <1 part, kaolinite 1 part, chlorite 2 parts, swelling chlorite 1 part, swelling illite 1 part, and illite 2 to 3 parts. Collectors, W. A. White and W. E. Parham, 1957. Clay mineral data, W. F. Bradley, 1958. Chemical analysis, L. D. McVicker, 1958.

Jackson County

- 1336A NW $\frac{1}{4}$ SW $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 10, T. 9 S., R. 2 W. West bank of ravine about 200 yards upstream from mine. About 16 feet medium gray to brownish gray shale in the Tradewater Group, very silty, hard, spheroidal weathering, some plant traces, poorly to fairly well bedded. The clay mineral data are quartz <1 part, kaolinite 2 to 3 parts, chlorite <1 part, swelling chlorite 2 parts, swelling illite <1 part, and illite 3 parts. Collectors, R. W. Doehler and B. F. Bohor, 1956. Clay mineral data, W. F. Bradley, 1958. Chemical analysis, L. D. McVicker, 1957.
- 1336B SE $\frac{1}{4}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 18, T. 9 S., R. 2 W. Southwest cut bank of creek just west of first bridge on north-south section-line road. Bottom 8 feet of 35-foot shale section in the Tradewater Group. Shale hard, medium gray, silty, very poorly bedded, semiconchoidal fracture, lower 2 feet becomes better bedded and carbonaceous. Collectors, R. W. Doehler and B. F. Bohor, 1956. Chemical analysis, L. D. McVicker, 1957.

Jasper County

- 1411 SE $\frac{1}{4}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 35, T. 7 N., R. 9 E. Northwest edge of Newton on east cut bank of tributary to Embarrass River. About 10 feet of shale in upper part of McLeansboro Group is exposed. Shale sandy, blue-gray, laminated. The clay mineral data are quartz >1 part, kaolinite 1 to 2 parts, chlorite 2 parts, swelling chlorite 2 parts, illite 3 parts. Collectors, W. A. White and W. E. Parham, 1957. Clay mineral data, W. F. Bradley, 1958. Chemical analysis, L. D. McVicker, 1958.

Kankakee County

- 775 Kankakee Tile and Brick Company, chemical data from their files. The clay is Wisconsin till.
- 1324B NW $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 8, T. 31 N., R. 9 E. Pit 11 of Northern Illinois Coal Company. Francis Creek Shale, blue-gray, approximately 20 feet thick. The clay mineral data are quartz <1 part, kaolinite 1 part, chlorite 4 parts, swelling illite <1 part, illite 4 parts, and siderite trace. Collector, W. A. White, 1956. Clay mineral data, W. F. Bradley, 1958. Chemical analysis, L. D. McVicker, 1958.

Knox County

- 1347A SE $\frac{1}{4}$ sec. 17, T. 11 N., R. 2 E. Purington Brick Company pit, southeast of East Galesburg. About 20 feet of Purington Shale exposed. The clay mineral data are kaolinite 2 parts, chlorite 1 part, swelling chlorite 1 part, swelling

illite 1 part, and illite 5 parts. Collector, W. A. White, 1956. Clay mineral data, W. F. Bradley, 1958. Chemical analysis, L. D. McVicker, 1958.

LaSalle County

- W5 SW $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 11, T. 33 N., R. 1 E. Matthiessen and Hegeler Zinc Company mine, LaSalle. Underclay of No. 7 Coal, 30 feet. Collector, H. B. Willman, 1931. Chemical data, O. W. Rees, 1933.
- W8 SE $\frac{1}{4}$ SE $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 14, T. 33 N., R. 1 E. Alpha Cement Company quarry, LaSalle, 5 feet of red clay over LaSalle Limestone. Collector, H. B. Willman, 1931. Chemical data, O. W. Rees, 1933.
- 1324A SW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 5, T. 33 N., R. 4 E. Laclede-Christy Division of H. K. Porter Company pit, 1 $\frac{1}{2}$ miles east of Ottawa, north of U. S. Highway 6. Lower 10 feet of Francis Creek Shale. Shale blue-gray, clayey. The clay mineral data are quartz <1 part, kaolinite 1 part, chlorite 4 parts, swelling illite <1 part, illite 4 parts, and siderite. Collector, W. A. White, 1956. Clay mineral data, W. F. Bradley, 1958. Chemical analysis, L. D. McVicker, 1957.
- 1403 SW $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 9, T. 33 N., R. 3 E. Illinois Valley Minerals Corporation pit, 1 $\frac{1}{2}$ miles west of Ottawa. Lower 8 feet of Francis Creek Shale, blue-gray, clayey, some pyrite. The clay mineral data are quartz 1 part, kaolinite 1 part, chlorite 2 parts, swelling illite 1 part, and illite 5 parts. Collectors, W. A. White and W. E. Parham, 1957. Clay mineral data, W. F. Bradley, 1958. Chemical analysis, L. D. McVicker, 1958.
- 1397 Same location as above, 6 feet of light gray underclay. Collectors, W. A. White and W. E. Parham, 1957. Chemical analysis, L. D. McVicker, 1957.
- 1485 SW $\frac{1}{4}$ NE $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 8, T. 32 N., R. 2 E. Conco-Meier Company clay pit about a mile northwest of Lowell. Cheltenham Clay, gray, 17 feet, with 10 feet of overburden. Collector, W. E. Parham, 1958. Chemical analysis, L. D. McVicker, 1959.
- 1486 NE $\frac{1}{4}$ NW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 8, T. 32 N., R. 2 E. Conco-Meier Company pit about a mile northwest of Lowell. Cheltenham Clay, 7 feet, with 20 feet of overburden. Collector, W. E. Parham, 1958. Chemical analysis, L. D. McVicker, 1959.
- 1497 NE $\frac{1}{4}$ NW $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 26, T. 33 N., R. 2 E. Clay, sandy, of Pennsylvanian age, 9 feet, may be cavity filling in St. Peter Sandstone, base covered; overburden 5 to 10 feet. Collector, W. E. Parham, 1958. Chemical analysis, L. D. McVicker, 1959.
- 1499A SW $\frac{1}{4}$ NE $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 25, T. 33 N., R. 2 E. In Illinois Canyon, 4 feet of gray underclay between green band below and No. 2 Coal above; overburden 8 to 20 feet. Collector, W. E. Parham, 1958. Chemical analysis, L. D. McVicker, 1959.
- 1506 SE $\frac{1}{4}$ NW $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 22, T. 33 N., R. 3 E. Underclay, 7 to 8 feet thick, between St. Peter Sandstone and No. 2 Coal; overburden 40 to 50 feet. Collector, W. E. Parham, 1958. Chemical analysis, L. D. McVicker, 1959.
- 1527 NW $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 26, T. 33 N., R. 2 E. Illinois Valley Minerals Corporation clay pit, Cheltenham Clay, gray, 6 feet, below green band that lies 3 feet

below No. 2 Coal. Collector, W. A. White, 1958. Chemical analysis, L. D. McVicker, 1959.

- 1454 SE $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 11, T. 33 N., R. 4 E. Shale pit of Material Service Corporation near Marseilles. About 30 to 40 feet of Canton Shale. Collector, W. A. White, 1958. Chemical analysis, L. D. McVicker, 1959.

Lawrence County

- 1426 SE $\frac{1}{4}$ SW $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 5, T. 3 N., R. 11 W. East cut bank of Embarrass River, north of U. S. Highway 50. Upper 10 feet of 30- to 40-foot shale in upper part of the McLeansboro Group, shale brownish gray, weathered, overburden 10 to 15 feet. The clay mineral data are kaolinite 2 parts, swelling illite 4 parts, illite 2 parts, and limonite. Collectors, W. A. White and W. E. Parham, 1957. Clay mineral data, W. F. Bradley, 1958. Chemical analysis, L. D. McVicker, 1958.

Livingston County

- 1321A SW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 34, T. 27 N., R. 8 E. Diller Tile Company pit, north of Chatsworth. Wisconsin glacial till, blue-gray. 15 feet. The clay mineral data are quartz >1 part, chlorite 4 parts, swelling chlorite 1 part, illite 3 parts, and CaCO₃. Collector, W. A. White, 1956. Clay mineral data, W. F. Bradley, 1958. Chemical analysis, L. D. McVicker, 1957.

Macoupin County

- 1407 NE $\frac{1}{4}$ NW $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 9, T. 9 N., R. 7 W. South cut bank of Honey Creek south of road. About 15 feet of sand shale of Trivoli Cyclothem is exposed, overburden thick. The clay mineral data are kaolinite 1 part, swelling chlorite and swelling illite 4 parts, illite 2 to 3 parts, and limonite. Collectors, W. A. White and W. E. Parham, 1957. Clay mineral data, W. F. Bradley, 1958. Chemical analysis, L. D. McVicker, 1958.

Madison County

- 393 SW $\frac{1}{4}$ sec. 35, T. 6 N., R. 10 W. Mine of Alton Brick Company north of Alton. Clay, gray, 3 to 7 feet below Seahorne Limestone. Collectors, R. E. Grim and J. M. Weller, 1933. Chemical analysis, L. D. McVicker, 1953.

No petrographic number Alton Brick Company mine, Cheltenham Clay. From files of Alton Brick Company.

- 1344A SE $\frac{1}{4}$ SE $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 35, T. 6 N., R. 10 W. Alton Brick Company shale pit east of road, south of Coal Creek, north of North Alton. Purington Shale, dark gray, lower 10 feet, along east face of shale pit. The clay mineral data are kaolinite 2 parts, chlorite 2 to 3 parts, swelling chlorite trace, illite 4 parts, and a little gypsum. Collector, W. A. White, 1956. Clay mineral data, W. F. Bradley, 1958. Chemical analysis, L. D. McVicker, 1958.

No petrographic number Same location as 1344A. Purington Shale. From files of Alton Brick Company.

- P7 SW $\frac{1}{4}$ NE $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 20, T. 3 N., R. 8 W. About 1 mile north of Collinsville. Lower 5 feet of gray loess of Pleistocene age. Collectors, J. C. Frye and H. B. Willman, 1958. Chemical analysis, L. D. McVicker, 1959.

- P8 Same location as P7 except from 5 to $13\frac{1}{2}$ feet above base. Wisconsin loess. Collectors, J. C. Frye and H. B. Willman, 1958. Chemical analysis, L. D. McVicker, 1959.
- P11 Same location as P7 except upper 10 feet of loess. Wisconsin loess. Collectors, J. C. Frye and H. B. Willman, 1958. Chemical analysis, L. D. McVicker, 1959.

Marion County

- H1 SW $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 14, T. 1 N., R. 4 E. North side of road in east valley wall of Skillet Fork Creek, upper 4 inches. Collector, M. M. Leighton, 1955. Chemical analysis, L. D. McVicker, 1956.
- H2 Same as H1 except 4 to 11 inches below top.
- H3 Same as H1 except 11 to 20 inches below top.
- H4 Same as H1 except 20 to 34 inches below top.
- H5 Same as H1 except 34 to 52 inches below top.
- H6 Same as H1 except 52 to 68 inches below top.
- H7 Same as H1 except 72 to 78 inches below top.
- H8 Same as H1 except 78 to 84 inches below top.
- H9 Same as H1 except 84 to 93 inches below top.
- H10 Same as H1 except 93 to 103 inches below top.
- H11 Same as H1 except 103 to 111 inches below top.
- H12 Same as H1 except 111 to 125 inches below top.
- H13 Same as H1 except 125 to 132 inches below top.
- H14 Same as H1 except 132 to 144 inches below top.
- H15 Same as H1 except 144 to 156 inches below top.
- H16 Same as H1 except 156 to 162 inches below top.
- H17 Same as H1 except 165 to 168 inches below top.
- H18 Same as H1 except 207 to 211 inches below top.
- H19 Same as H1 except 256 to 260 inches below top.

(All of the H series of samples are of Pleistocene age. H1 to H6 are Peorian loess, H7 to H8 are Farmdale loess, and H9 to H19 are Illinoian till.)

Marshall County

- W30 NW $\frac{1}{4}$ SE $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 23, T. 12 N., R. 9 E. Hydraulic-Press Brick Company underground mine about 2 miles south of Sparland, 8 feet of underclay of Trade-water age. Collector, H. B. Willman. Chemical data, O. W. Rees, 1933.
- 225 Same location as above. Eight feet of light to dark gray clay. Collector, R. E. Grim, 1931. Chemical data, O. W. Rees, 1932.

- 1400 SE $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 23, T. 12 N., R. 9 E. Road cut west side of Illinois Highway 29 between the Hydraulic-Press Brick Company plant and Sparland. Farmington Shale, weathered gray, lower 15 feet, overburden thick. The clay mineral data are quartz 1 part, kaolinite 2 parts, chlorite ?, swelling chlorite 2 to 3 parts, and illite 3 parts. Collectors, W. A. White and W. E. Parham, 1957. Clay mineral data, W. F. Bradley, 1958. Chemical analysis, L. D. McVicker, 1958.
- 1453 NW $\frac{1}{4}$ SE $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 23, T. 12 N., R. 9 E. Shale pit of Hydraulic-Press Brick Company, about 2 miles south of Sparland. Farmington Shale, gray, 20 feet; above No. 7 Coal. Collector, W. A. White, 1958. Chemical analysis, L. D. McVicker, 1959.

McDonough County

- 252 SE $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 12, T. 5 N., R. 4 W. Colchester Brick and Tile Company pit, north edge of Colchester. Sample represents in descending order 6 feet of gray-green clay, 4 feet of brown-gray clay, and 6 feet of blue-gray clay; it underlies 3 feet of No. 2 Coal and rests on 2 feet of sandstone. Total overburden is 23 feet thick. Collector, R. E. Grim. Chemical data, O. W. Rees, 1933.
- 1325A Same location as above except 20 feet of Francis Creek Shale above No. 2 Coal, no overburden. The clay mineral data are quartz >1 part, kaolinite 1 part, chlorite 3 parts, swelling chlorite 1 part, swelling illite 1 part, and illite 3 parts. Collector, W. A. White, 1956. Clay mineral data, W. F. Bradley, 1958. Chemical analysis, L. D. McVicker, 1957.
- 1325B Same location as 1325A. Top 10 feet of Francis Creek Shale. Collector, W. A. White, 1956. Chemical analysis, L. D. McVicker, 1959.

Menard County

- 1330A SW $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 11, T. 18 N., R. 7 W. Springfield Clay Products Company pit north of Petersburg. Shale in Trivoli Cyclothem, 35 feet, with 20 feet of overburden. The clay mineral data are quartz <1 part, kaolinite 1 part, chlorite 2 parts, swelling chlorite 2 parts, swelling illite 1 part, and illite 3 parts. Collector, W. A. White, 1956. Clay mineral data, W. F. Bradley, 1958. Chemical analysis, L. D. McVicker, 1957.
- P91 NW $\frac{1}{4}$ NW $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 23, T. 18 N., R. 7 W. About 2 $\frac{1}{2}$ miles east of Petersburg. Top 20 feet of Illinoian age loess. Collectors, J. C. Frye and H. B. Willman, 1958. Chemical analysis, L. D. McVicker, 1959.

Mercer County

- 1348A SW $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 8, T. 14 N., R. 2 W. Shale pit of Hydraulic-Press Brick Company at Shale City. Both Francis Creek Shale and shale of the Greenbush Cyclothem are mined. Sample represents 30 feet of blue-gray shale of the Greenbush Cyclothem, below the No. 2 Coal and underclay. The clay mineral data are kaolinite 2 to 3 parts, chlorite 2 to 3 parts, swelling illite >1 part, and illite 4 parts. Collector, W. A. White, 1956. Clay mineral data, W. F. Bradley, 1958. Chemical analysis, L. D. McVicker, 1958.

Montgomery County

- 1412 NW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 30, T. 8 N., R. 2 W. One and a half miles northeast of Coffeen, 5 to 6 feet of an iron-stained gray shale of the McLeansboro Group between the Shoal Creek and Millersville Limestones with plant fossils and coal bank in middle of shale exposure on west bank of East Fork Creek. The clay mineral data are kaolinite 3 parts, chlorite 1 part, swelling illite 1 part, and illite 5 parts. Collectors, W. A. White and W. E. Parham, 1957. Clay mineral data, W. F. Bradley, 1958. Chemical analysis, L. D. McVicker, 1958.

Ogle County

- P2 Near Polo, Illinois, 6 to 8 inches below top. Collector, M. M. Leighton, 1955. Chemical data, L. D. McVicker, 1956.
- P4 Same as P2 except 18 to 24 inches below top.
- P7 Same as P2 except 36 to 42 inches below top.
- P14 Same as P2 except 72 to 84 inches below top.
- P21 Same as P2 except 130 to 132 inches below top.

(All of P series of samples are of Pleistocene age.)

Peoria County

- 1402 SE $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 13, T. 11 N., R. 6 E. Northwest corner of Princeville. Shale occurs on east bank of Prince Run Creek, 8 feet of gray shale in either the Sparland or Brereton Cyclothem is exposed. Overburden is thin. The clay mineral data are kaolinite 1 part, chlorite 1 part, swelling chlorite 2 parts, swelling illite 1 part, and illite 3 parts. Collectors, W. A. White and W. E. Parham, 1957. Clay mineral data, W. F. Bradley, 1958. Chemical analysis, L. D. McVicker, 1958.
- W143C SW $\frac{1}{4}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 8, T. 11 N., R. 9 E. North of Chillicothe, 1 foot of flint clay in Lonsdale Limestone. Collector, H. B. Willman. Chemical data, O. W. Rees, 1933.
- W143e Same location as above. Two feet of flint clay in Lonsdale Limestone. Collector, H. B. Willman. Chemical data, O. W. Rees, 1933.

Perry County

- 1323A NE $\frac{1}{4}$ SW $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 5, T. 4 S., R. 4 W. About 2 miles northeast of Coulterville, along east bank of north flowing tributary to Mud Creek about 1/8 mile east of road. Shale, gray-brown grading to blue-gray, hard, well laminated, 12 feet, in lower part of McLeansboro Group. The clay mineral data are quartz >1 part, kaolinite <1 part, chlorite 3 parts, swelling illite 1 part, illite 3 parts, CaCO₃, and limonite. Collectors, R. W. Doehler and B. F. Boher, 1956. Clay mineral data, W. F. Bradley, 1958. Chemical analysis, L. D. McVicker, 1957.
- 1309A SW $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 5, T. 6 S., R. 1 W. North of DuQuoin. Taken from core of J. H. Forester well 1, shale in Brereton Cyclothem 42 to 55 feet beneath the surface. Weathered shale. Chemical analysis, L. D. McVicker, 1957.

1309B Same location as 1309A except 72 to 77 feet below the surface. Below No. 5 Coal, a gray clay shale. Chemical analysis, L. D. McVicker, 1957.

1309C Same location as 1309A except 78 to 122 feet below the surface. Shale is above No. 4 Coal. Chemical analysis, L. D. McVicker, 1957.

Pike County

R119 SE $\frac{1}{4}$ SE $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 13, T. 7 S., R. 3 W. Near Straut, 3 feet of clay of the Tradewater Group. Collector, T. B. Root, 1930. Chemical data, O. W. Rees, 1933.

R120 Same location as R119. Three feet of clay in Tradewater Group. Collector, T. B. Root, 1930. Chemical data, O. W. Rees, 1933.

LA1 NW $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 25, T. 7 S., R. 4 W. About 2 miles southwest of Nebo. Clay in Tradewater Group.

LA2 Same location as above. Clay in Tradewater Group.

DS51 SE $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 24, T. 4 S., R. 7 W. North of Kinderhook, east of U. S. Highway 36 in Mississippi River bluff. Hannibal Formation, siltstone, green, 45 feet. Collector, R. E. Grim, 1938. Chemical analysis, L. D. McVicker, 1940.

DS45 SW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 36, T. 6 S., R. 5 W. About 3 miles southeast of Atlas. Hannibal Formation, siltstone, light greenish gray, 30 feet. Collector, R. E. Grim, 1938. Chemical analysis, L. D. McVicker, 1940.

996N NW $\frac{1}{4}$ SW $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 10, T. 4 S., R. 5 W. About 2 $\frac{1}{4}$ miles north of Hadley on north side of old road cut just before road turns north. In south valley wall of Hadley Creek, 8 feet of Cheltenham Clay, gray, overburden 20 to 40 feet. Collector, W. A. White, 1949. Chemical analysis, L. D. McVicker, 1953.

Randolph County

1418 NW $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 32, T. 7 S., R. 6 W. About 2 miles southeast of Chester, west cut bank of Chester and Mt. Vernon Railroad, and of county road in west valley wall of Marys River, southwest of Illinois Highway 3. About 30 feet of Waltersburg Shale, dark gray, with considerable organic matter; shale is thinly laminated in lower 20 feet, beds massive and cemented in upper 10 feet. The clay mineral data are quartz 1 part, chlorite 1 part, swelling illite 4 parts, and illite 2 to 3 parts. Collectors, W. A. White and W. E. Parham, 1957. Clay mineral data, W. F. Bradley, 1958. Chemical analysis, L. D. McVicker, 1958.

1338A NW $\frac{1}{4}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 5, T. 7 S., R. 5 W. Near Wine Hill along gully flowing south, due south of church in Wine Hill. Shale in the Caseyville Group is greenish gray and silty in bottom 2 feet, grades upward to green and purple (variegated), less silty, and more weathered in top 8 feet. The clay mineral data are quartz <1 part, kaolinite 1 part, chlorite 1 part, swelling chlorite ?, swelling illite 1 part, illite 4 parts, and CaSO₄·2H₂O. Collectors, R. W. Doehler and B. F. Boher, 1956. Clay mineral data, W. F. Bradley, 1958. Chemical analysis, L. D. McVicker, 1957.

1338B NW $\frac{1}{4}$ NW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 6, T. 7 S., R. 5 W. About 1 $\frac{1}{4}$ miles west of Wine Hill. Shale exposed in south branch of Hornbastel Branch beside road about 200 feet south of the southernmost bridge across Hornbastel Branch. Shale of Caseyville

- Group is light brownish gray, well bedded, 9 feet, overburden thin. The clay mineral data are quartz <1 part, kaolinite 1 part, chlorite 1 part, swelling chlorite 2 parts, swelling illite 1 part, illite 3 parts, and $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$. Collectors, R. W. Doehler and B. F. Boher, 1956. Clay mineral data, W. F. Bradley, 1958. Chemical analysis, L. D. McVicker, 1957.
- 1308A NE $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 36, T. 4 S., R. 5 W. F. Birchler hole 1, Moffatt Coal Company. Shale in the lower part of the McLeansboro Group, 58 to 75 feet beneath surface. Chemical analysis, L. D. McVicker, 1957.
- 1308B Same location and age as 1308A except 75 to 141 feet below surface. Composite sample. The clay mineral data are quartz <1 part, kaolinite 2 parts, chlorite 1 part, swelling illite and illite 6 parts. Clay mineral data, W. F. Bradley, 1958. Chemical analysis, L. D. McVicker, 1957.
- 1308C Same location and age as 1308A except 101 to 103 feet below surface. Chemical analysis, L. D. McVicker, 1957.
- 1308D Same as 1308A except 103 to 111 feet below surface. Chemical analysis, L. D. McVicker, 1957.
- 1308E Same as 1308A except 115 to 121 feet below surface. Chemical analysis, L. D. McVicker, 1957.
- 1308F Same as 1308A except 121 to 131 feet below surface. Chemical analysis, L. D. McVicker, 1957.

Richland County

- 1413 NE corner sec. 14, T. 2 N., R. 10 E. About 1 $\frac{1}{4}$ miles north of Parkersburg along south-flowing tributary to Sugar Creek, south of unimproved dirt road. About 3 feet of weathered shale in the upper part of McLeansboro Group is exposed in tributary. The clay mineral data are quartz <1 part, kaolinite 1 part, chlorite 1 part, swelling chlorite 2 parts, illite 2 parts, and limonite. Collectors, W. A. White and W. E. Parham, 1957. Clay mineral data, W. F. Bradley, 1958. Chemical analysis, L. D. McVicker, 1958.

Rock Island County

- 1354A SW $\frac{1}{4}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 6, T. 17 N., R. 5 W. About 2 $\frac{1}{2}$ miles southeast of Muscatine, Iowa, along north road cut of Illinois Highway 99 on east bluff of Mississippi River. About 30 feet of well laminated, organic, rich, dark gray shale in the lower part of the Tradewater Group. The clay mineral data are kaolinite 2 parts, chlorite 1 part, swelling illite 2 parts, and illite 3 to 4 parts. Collector, W. A. White, 1956. Clay mineral data, W. F. Bradley, 1958. Chemical analysis, L. D. McVicker, 1957.

St. Clair County

- 1334A NW $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 31, T. 2 N., R. 8 W. Hydraulic-Press Brick Company pit about 2 miles east of Edgemont. Shale in lower part of McLeansboro Group, blue-gray, about 40 feet. The clay mineral data are quartz 1 part, kaolinite 1 to 2 parts, chlorite 3 parts, swelling illite <1 part, illite 3 parts, and CaCO_3 . Collector, W. A. White, 1956. Clay mineral data, W. F. Bradley, 1958. Chemical analysis, L. D. McVicker, 1957.

- 1333A NE $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 32, T. 2 N., R. 8 W. Hill Brick Company pit, about 3 miles east of Edgemont. About 40 feet of sand shale in lower part of McLeansboro Group. The clay mineral data are quartz 1 part, kaolinite 1 part, chlorite 3 parts, swelling illite <1 part, illite 4 parts, and CaCO₃?. Collector, W. A. White, 1956. Clay mineral data, W. F. Bradley, 1958. Chemical analysis, L. D. McVicker, 1957.
- 1329B Center SW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 21, T. 1 S., R. 7 W. About 1 mile east of Freeburg, north side of road on east side of stream valley. Shale in lower part of McLeansboro Group, gray, 10 to 12 feet, taken from road level to top of shale. The clay mineral data are quartz 1 part, kaolinite 1 part, chlorite 3 parts, swelling illite 1 part, illite 3 parts, and CaCO₃. Collectors, R. W. Doehler and B. F. Boher, 1956. Clay mineral data, W. F. Bradley, 1958. Chemical analysis, L. D. McVicker, 1957.
- 1329A SW $\frac{1}{4}$ NW $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 21, T. 2 N., R. 8 W. About 2 miles east of French Village, west bank of tributary of Little Canteen Creek. A shale in the lower part of the McLeansboro Group, olive gray grading to dark gray, 16 to 17 feet. The clay mineral data are quartz <1 part, kaolinite 1 part, chlorite 3 parts, swelling chlorite 1 part, swelling illite <1 part, illite 3 parts, and CaCO₃. Collectors, R. W. Doehler and B. F. Boher, 1956. Clay mineral data, W. F. Bradley, 1958. Chemical analysis, L. D. McVicker, 1957.

Saline County

- 1327A SE $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 21, T. 9 S., R. 6 E. Pit of Harrisburg Brick and Tile Company, southeast edge of Harrisburg. Sample represents lower 8 feet of shale which is either in the Brereton Cyclothem or in the lower part of the McLeansboro Group. The clay mineral data are kaolinite 3 parts, chlorite 2 parts, and illite 4 parts. Collector, W. A. White, 1956. Clay mineral data, W. F. Bradley, 1958. Chemical analysis, L. D. McVicker, 1958.

Sangamon County

- 1332A SW $\frac{1}{4}$ sec. 1, T. 15 N., R. 5 W. Poston Brick and Concrete Products Company, southeast part of Springfield. Shale of the Trivoli Cyclothem, gray, massive, 35 feet. The clay mineral data are quartz 1 part, kaolinite 1 part, chlorite 2 to 3 parts, swelling illite 1 part, illite 2 to 3 parts, and CaCO₃?. Collector, W. A. White, 1956. Clay mineral data, W. F. Bradley, 1958. Chemical analysis, L. D. McVicker, 1957.
- 1330B Sec. 11, T. 15 N., R. 5 W. Springfield Clay Products Company pit, southeast part of Springfield. Shale in the Trivoli Cyclothem, massive, blue-gray, 30 feet. The clay mineral data are quartz <1 part, kaolinite <1 part, chlorite 3 parts, swelling chlorite 1 part, swelling illite 1 part, and illite 3 parts. Collector, W. A. White, 1956. Clay mineral data, W. F. Bradley, 1958. Chemical analysis, L. D. McVicker, 1958.

Schuyler County

- R210 NW $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 8, T. 1 N., R. 1 E. Northwest of Frederick. Clay of Tradewater Group, 11 feet. Collector, T. B. Root. Chemical data, O. W. Rees, 1933.

- 1410 SE $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 27, T. 2 N., R. 2 W. About 2 miles west of Rushville, north road cut on east valley wall of Harvey Branch. Purington Shale, light blue-gray, 20 feet. The clay mineral data are quartz <1 part, kaolinite 1 to 2 parts, chlorite 2 to 3 parts, swelling chlorite 1 part, swelling illite 1 part, and illite 3 parts. Collectors, W. A. White and W. E. Parham, 1957. Clay mineral data, W. F. Bradley, 1958. Chemical analysis, L. D. McVicker, 1958.

Scott County

- R129 SE $\frac{1}{4}$ SE $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 23; T. 15 N., R. 13 W. About $\frac{3}{4}$ mile northwest of Exeter. Clay 4 $\frac{1}{2}$ feet and shale 11 feet immediately below Seahorne Limestone. Collector, T. B. Root. Chemical data, O. W. Rees, 1933.

Shelby County

- 1422 NW corner sec. 24, T. 11 N., R. 3 E. About 1 mile southwest of Shelbyville on east road cut in south valley wall of creek. About 6 feet of shale in upper part of McLeansboro Group exposed, overburden thin. The clay mineral data are kaolinite 2 parts, chlorite 1 part, swelling chlorite 3 to 4 parts, illite 2 parts, and limonite. Collectors, W. A. White and W. E. Parham, 1957. Clay mineral data, W. F. Bradley, 1958. Chemical analysis, L. D. McVicker, 1958.

Stark County

- 1398 NE $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 25, T. 13 N., R. 6 E. About $\frac{3}{4}$ mile north of Wyoming, south cut bank of tributary to Spoon River south of road. Exposure consists of 8 feet of shale in Brereton ? Cyclothem. The clay mineral data are kaolinite 2 parts, chlorite 3 parts, swelling illite 1 part, and illite 3 parts. Collectors, W. A. White and W. E. Parham, 1957. Clay mineral data, W. F. Bradley, 1958. Chemical analysis, L. D. McVicker, 1958.

Tazewell County

- R220 NW $\frac{1}{4}$ NW $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 5, T. 25 N., R. 4 W. South of East Peoria. Underclay 13 $\frac{1}{2}$ feet below No. 6 Coal. Collector, T. B. Root. Chemical data, O. W. Rees, 1933.
- 1322B Peoria Brick and Tile Company pit. Sample of Canton ? Shale taken from shale bin. The clay mineral data are quartz 1 part, kaolinite 3 parts, chlorite 2 to 3 parts, and illite 4 parts. Collector, W. A. White, 1956. Clay mineral data, W. F. Bradley, 1958. Chemical analysis, L. D. McVicker, 1958.

Union County

- B15 Pit of Illinois Kaolin Company near Anna. Cretaceous clay. Collector, V. T. Allen. Chemical data, O. W. Rees, 1932.
- 1425 SW $\frac{1}{4}$ NW $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 14, T. 12 S., R. 2 W. About 2 miles west of Anna, west of State Pond dam on south valley wall of creek below dam. Shale of New Albany Formation, black, fissile, 20 feet. The clay mineral data are quartz 1 to 2 parts, chlorite 1 part, and illite 7 parts. Collectors, W. A. White and W. E. Parham, 1957. Clay mineral data, W. F. Bradley, 1958. Chemical analysis, L. D. McVicker, 1958.

1335A NE $\frac{1}{4}$ SE $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 11, T. 13 S., R. 2 W. About 3 $\frac{1}{2}$ miles west of south of Jonesboro, cut bank southeast side of creek along west fork of hard road. Springville Shale, pinkish brown to tan to maroon to light gray, silty at top, less silty at bottom, grading from massive to poorly to thinly bedded, 50 feet; entire bluff is shale. The clay mineral data are quartz 2 parts, kaolinite <1 part, swelling chlorite <1 part, swelling illite <1 part, and illite 7 parts. Collectors, R. W. Doehler and B. F. Boher, 1956. Clay mineral data, W. F. Bradley, 1958. Chemical analysis, L. D. McVicker, 1957.

Vermilion County

1342A NW $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 14, T. 19 N., R. 12 W. Western Brick Company pit, about 1 mile southeast of Batestown. About 25 feet of shale in the Sparland Cyclothem is exposed. The clay mineral data are quartz 1 part, kaolinite 1 part, chlorite 3 parts, swelling illite 1 part, illite 4 parts, and CaSO₄·2H₂O. Collector, W.A. White, 1956. Clay mineral data, W. F. Bradley, 1958. Chemical analysis, L.D. McVicker, 1958.

1343A E $\frac{1}{2}$ sec. 4, T. 19 N., R. 12 W. Harmattan Mine of Fairview Collieries, about 1 mile west of Hillery. Lower 10 feet of blue-gray shale in Sparland Cyclothem. The clay mineral data are chlorite 3 parts, swelling illite 1 part, illite 5 parts, and goethite. Collector, W. A. White, 1956. Clay mineral data, W. F. Bradley, 1958. Chemical analysis, L. D. McVicker, 1957.

1343B Same location and age as 1343A except upper 10 feet of shale is more weathered. The clay mineral data are chlorite 3 parts, swelling illite 1 part, illite 5 parts, CaSO₄·2H₂O, and goethite. Collector, W. A. White, 1956. Clay mineral data, W. F. Bradley, 1958. Chemical analysis, L. D. McVicker, 1957.

Washington County

1339A SE $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 18, T. 2 S., R. 4 W. About 7 $\frac{1}{2}$ miles south of east of St. Libory, road cut west side of Elkhorn Creek. Shale in the lower part of McLeansboro Group, olive gray, clayey, fairly well bedded, plant fossils, ironstone concretions, 12 $\frac{1}{2}$ feet. The clay mineral data are quartz <1 part, kaolinite 2 parts, chlorite 1 part, swelling illite 2 parts, and illite 4 parts. Collectors, R. W. Doehler and B. F. Boher, 1956. Clay mineral data, W. F. Bradley, 1958. Chemical analysis, L. D. McVicker, 1957.

White County

1409 NW $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 11, T. 5 S., R. 9 E. About 1 mile northwest of Carmi, about 200 yards east of road on south bank of Big Hill Branch. About 8 feet of dark gray shale in the upper part of the McLeansboro Group is exposed. The clay mineral data are quartz <1 part, kaolinite 1 to 2 parts, chlorite 2 parts, swelling chlorite 1 part, swelling illite ?, and illite 2 parts. Collectors, W. A. White and W. E. Parham, 1957. Clay mineral data, W. F. Bradley, 1958. Chemical analysis, L. D. McVicker, 1958.

Williamson County

1419 S $\frac{1}{2}$ N $\frac{1}{2}$ sec. 21, T. 9 S., R. 4 E. Delta Mine-Carmac Coal Company. About 2 miles east of Crab Orchard. About 20 feet of blue-gray Canton Shale. The clay

mineral data are quartz <1 part, kaolinite 2 parts, chlorite 2 parts, swelling illite 1 part, illite 3 parts, and limonite. Collectors, W. A. White and W. E. Parham, 1957. Clay mineral data, W. F. Bradley, 1958. Chemical analysis, L. D. McVicker, 1958.

- 1429 SE $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 25, T. 10 S., R. 3 E. About a half mile east of Creal Springs, east face of old stone quarry. About 6 feet of gray shale in the Tradewater Group. The clay mineral data are quartz <1 part, kaolinite 3 parts, chlorite 1 part, swelling chlorite 1 part, swelling illite <1 part, illite 5 parts, and limonite. Collectors, W. A. White and W. E. Parham, 1957. Clay mineral data, W. F. Bradley, 1958. Chemical analysis, L. D. McVicker, 1958.

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Table 1. - Chemical Analyses of

Petro- graphic No.	Location	Type*		SiO ₂	TiO ₂	Al ₂ O ₃	Fe ₂ O ₃	FeO	MgO	CaO
		Rock	of							
ADAMS COUNTY										
L4b	Near Mendon on Webb Cr.	?		50.81	-	10.52	7.01	-	5.74	10.65
L4a	Near Mendon	Cl		49.03	-	11.91	10.75	-	5.73	8.41
ALEXANDER COUNTY										
1423	NW NW 21-15S-3W	Cl		71.39	-	18.05	1.62	0.32	1.25	0.07
4	SE SE 28-15S-3W	Cl		52.23	0.37	25.85	4.04	-	2.69	0.60
1424	SE SE 28-15S-3W	Sh		61.59	-	16.31	3.29	1.68	3.08	3.23
DS7	SE SE 28-15S-3W	Sh		49.80	0.45	23.15	5.96	2.05	4.04	1.63
DS4	SE NW 4-15S-3W	L		63.96	-	13.76	3.27	-	5.11	5.17
NF570	NW SE NW 12-14S-3W	Al		72.79	-	13.45	3.79	-	1.14	1.25
NF513	NE NE SW 33-14S-3W	L		71.01	0.66	9.94	2.45	0.51	2.29	4.02
NF528	SW NW SW 23-14S-3W	Sh		33.80	0.39	7.67	2.05	0.57	4.20	24.61
L62	E ₂ SW SE 21-15S-3W	Sh		61.62	-	19.85	6.56	-	2.01	0.61
NF523	SE SW NW 21-15S-3W	Sh		34.70	-	8.14	2.52	-	1.50	27.34
BOND COUNTY										
1415	Richards Brick Co. pit	Sh		49.00	-	24.67	5.44	5.79	2.36	0.49
1530A	NE NW 13-6N-5W	Sh		52.83	-	24.30	1.94	5.72	2.40	0.62
1530B	NE NW 13-6N-5W	Sh		56.73	-	23.39	7.10	0.51	1.94	0.44
1530C	NE NW 13-6N-5W	T		73.96	-	13.25	5.14	0.28	0.90	0.45
1530D	NE NW 13-6N-5W	Sh		53.26	-	24.54	1.47	5.66	2.32	0.59
1530E	NE NW 13-6N-5W	Sh		55.78	-	23.00	1.91	4.94	2.11	0.51
1530F	NE NW 13-6N-5W	Sh		60.19	-	21.83	5.86	0.70	1.75	0.52
1530G	NE NW 13-6N-5W	Sh		53.04	-	24.43	2.12	5.45	2.40	0.61
1530H	NE NW 13-6N-5W	T		65.34	-	16.46	7.83	0.27	1.31	0.29
BROWN COUNTY										
C19b	NW 18-2S-3W	Sh		56.64	-	(R ₂ O ₃	10.80)	-	0.68	16.74
L17	John Chamberlain property	Sh		59.92	-	15.75	7.06	-	3.28	2.94
L18	Jesse Gibson property	Sh		61.50	-	18.75	5.99	-	2.10	0.83
1337A	Frederic Brick & Tile pit	Sh		53.58	-	20.70	1.07	8.08	2.76	0.92
1337B	Frederic Brick & Tile pit	Sh		58.32	-	20.65	6.96	2.75	2.15	0.34
1351	N. edge Mt. Sterling on Illinois Highway 99	Unc	#4 Coal	60.78	-	22.83	3.07	0.60	1.08	0.27
L6	19-2S-2W	T		61.11	-	14.76	6.31	-	3.34	5.55
BUREAU COUNTY										
E15b	31-16N-11E	Sh		49.10		(R ₂ O ₃	27.34)	-	2.74	7.94
254	Sheffield Shale Products	Sh		51.85	1.49	25.60	2.16	3.49	2.65	0.81
1404	Sheffield Shale Products	Sh		57.92	-	21.61	6.43	1.98	1.99	0.39

* Key to symbols:

Sh - shale Cl - clay Al - alluvium L - loess St - silt
Df - drift Unc - underclay Col - colluvium T - till S - soil

Clay Materials in Illinois

Na ₂ O	K ₂ O	Ign.	Total	SO ₃	CO ₂	H ₂ O ⁺	H ₂ O ⁻	Unit	Age	Reference No.
ADAMS COUNTY										
-	-	13.30	98.03	-	-	-	-	-	Pleis.?	5
-	-	13.02	98.85	-	-	-	-	-	Pleis.?	5
ALEXANDER COUNTY										
0.02	3.07	4.71	100.50	-	-	-	0.66	-	Eocene	35
0.33	6.56	7.88	100.55	-	-	7.88	1.13	-	Eocene	15
0.25	4.34	6.84	100.61	-	-	-	0.87	Orchard Cr.	Sil.	25
0.04	6.53	6.71	100.36	-	-	6.11	1.82	Orchard Cr.	Sil.	25
-	-	8.82	100.09	-	5.52	-	1.10	-	Pleis.	6
0.90	2.11	4.04	-	-	0.13	-	-	-	Recent?	26
1.55	2.35	5.42	-	0.06	3.70	-	-	Wisconsin	Pleis.	26
0.10	3.53	23.80	-	0.06	21.76	-	-	Moccasin Sp.	Sil.	26
0.16	3.71	4.97	-	-	0.00	-	-	Moccasin Sp.	Sil.	26
0.08	2.76	23.39	-	-	21.44	-	-	Orchard Cr.	Sil.	26
BOND COUNTY										
0.74	3.50	8.16	100.15	-	-	-	0.79	Bunje	Penn.	25
0.84	3.48	7.94	100.07	0.49	1.14	6.26	1.50	McLeansboro	Penn.	25
0.88	3.28	6.23	100.50	0.14	0.00	5.80	2.55	McLeansboro	Penn.	25
0.79	1.79	3.96	100.52	0.13	0.00	3.66	2.58	Illinoian	Pleis.	25
0.82	3.53	7.69	99.88	0.55	0.85	6.53	1.35	McLeansboro	Penn.	25
0.98	3.34	7.31	99.88	1.62	0.59	5.99	1.14	McLeansboro	Penn.	25
1.08	3.31	5.66	100.90	0.00	0.12	5.25	2.35	McLeansboro	Penn.	25
0.86	3.48	7.77	100.16	0.50	0.88	6.60	1.32	McLeansboro	Penn.	25
0.80	2.09	5.92	100.31	0.16	0.00	5.04	3.34	Illinoian	Pleis.	25
BROWN COUNTY										
-	-	14.76	99.62	-	-	-	0.39	Salem	Miss.	5
-	-	8.46	98.11	-	-	-	-	-	Penn.?	5
-	-	8.84	98.01	-	-	-	-	-	Penn.?	5
1.25	3.14	7.79	99.29	-	-	5.60	0.83	Purington	Penn.	25
1.41	3.12	4.63	100.33	-	-	-	0.79	Purington	Penn.	25
0.27	1.29	9.73	99.92	-	-	-	3.15	Sumnum	Penn.	25
-	-	8.00	99.07	-	5.52	-	-	Illinoian	Pleis.	5
BUREAU COUNTY										
-	-	12.88	100.00	-	-	-	-	McLeansboro	Penn.	5
0.64	4.35	6.73	99.77	-	-	7.17	0.43	Brereton	Penn.	19
1.24	3.41	4.91	99.88	-	-	-	0.78	Brereton	Penn.	25

Table 1. -

Petro- graphic No.	Location	Type* of								
		Rock	SiO ₂	TiO ₂	Al ₂ O ₃	Fe ₂ O ₃	FeO	MgO	CaO	
CALHOUN COUNTY										
TS	SW 6-8S-3W	Cl	45.17	-	38.78	1.78	-	0.07	0.71	
OOP1	SW 6-8S-3W	Cl	52.00	-	33.34	2.21	-	0.84	tr	
OOP2	SW 6-8S-3W	Cl	57.24	-	30.74	1.74	-	0.30	tr	
DS38	NW SE 15-10S-2W	Sh	50.23	0.53	21.66	7.34	0.89	5.79	0.92	
R5	SW NW 31-9S-2W	Sh	69.20	-	15.38	4.18	-	2.50	1.35	
R7	NE SW 17-11S-2W	Sh	56.69	-	23.31	6.05	-	1.80	2.81	
R104	NW SW SE 3-9S-2W	Sh	68.42	0.13	14.34	3.40	-	2.38	1.84	
1349A	NE NE NE 11-9S-3W	Sh	70.75	-	14.00	2.32	1.91	2.39	0.07	
1352A	SW NE SW 17-11S-2W	Sh	60.14	-	18.77	4.63	1.51	2.56	1.25	
1532	NE NW NW 32-11S-2W	L	65.73	-	9.70	2.21	0.56	3.89	6.56	
CARROLL COUNTY										
H20	Dupiers and Son farm	Sh	47.29	-	15.51	4.80	-	6.19	7.33	
CASS COUNTY										
P99	C E line, 11-18N-11W	Col	75.80	0.64	11.79	2.70	0.58	1.17	1.43	
P101	C E line, 11-18N-11W	L	65.65	0.66	9.72	2.95	0.42	3.82	5.49	
P103	C E line, 11-18N-11W	L	64.97	0.56	9.52	2.59	0.42	4.24	5.99	
P105	C E line, 11-18N-11W	L	76.65	0.91	10.89	2.59	0.81	1.00	1.59	
P108	C E line, 11-18N-11W	L	58.88	0.55	8.42	1.65	0.68	5.73	8.98	
CHRISTIAN COUNTY										
1428	SE NE 33-11S-1E	Sh	62.24	-	21.36	3.17	1.82	1.94	0.37	
CLARK COUNTY										
L14	1 $\frac{1}{2}$ mi. NE of Marshall	Sh	66.32	-	17.25	7.44	-	3.38	2.01	
L15	1 $\frac{1}{2}$ mi. NE of Marshall	Sh	68.20	-	14.09	9.94	-	3.46	1.57	
1345A	NE NE SW 16-11N-11W	Sh	56.21	-	20.74	8.02	2.40	1.81	0.45	
CLAY COUNTY										
B18	SE cor. SW NE 35-5N-6E	T**	79.04	0.51	11.04	3.47	-	0.72	0.39	
1420	SE NW 19-4N-6E	Sh	59.64	-	23.35	3.33	1.72	1.98	0.34	
CLINTON COUNTY										
1093	NE NE NW 26-1N-3W	Sh	48.34	0.92	19.44	-	4.56	2.25	0.30	
1414	SW 1-1N-1W	Sh	55.88	-	20.99	10.27	1.19	1.65	0.54	
COOK COUNTY										
DS82	NE 30-37N-14E	T	52.01	0.61	17.04	4.36	-	5.01	7.78	
NF57	SE NW SE 33-36N-14E	T	48.40	-	(R ₂ O ₃ 17.5)	-	-	6.40	10.10	
D7	SE SE 33-39N-14E	T	50.35	-	12.92	4.96	-	5.04	8.13	
D5	SW 35-37N-14E	St	48.64	-	12.20	4.19	-	5.27	10.47	

* Key to symbols:

Sh - shale Cl - clay Al - alluvium L - loess St - silt
 Df - drift Unc - underclay Col - colluvium T - till S - soil

** MnO 0.33

Continued

Na ₂ O	K ₂ O	Ign.	Total	SO ₃	CO ₂	H ₂ O ⁺	H ₂ O ⁻	Unit	Age	Reference No.
CALHOUN COUNTY										
-	-	13.16	-	0.33	-	-	-	Cheltenham	Penn.	11
-	-	11.52	-	-	-	-	-	Cheltenham	Penn.	11
-	-	10.03	-	-	-	-	-	Cheltenham	Penn.	11
0.37	5.97	6.83	100.53	-	-	6.68	2.48	Hannibal	Miss.	25
-	-	5.90	-	0.15	-	-	-	Hannibal	Miss.	9
-	-	7.92	-	0.14	-	-	-	Maquoketa	Ord.	6
0.38	3.97	5.32	100.18	0.00	2.04	-	0.77	Hannibal	Miss.	25
1.00	4.53	3.67	100.64	-	-	-	1.42	Hannibal	Miss.	25
0.30	5.88	5.41	100.45	-	-	-	1.40	Maquoketa	Ord.	25
1.31	1.65	8.63	100.24	0.08	7.06	1.77	1.02	Wisconsin	Pleis.	25
CARROLL COUNTY										
(Alk 3.71)	13.11	-	-	-	-	-	1.31	Maquoketa	Ord.	3
CASS COUNTY										
1.76	2.04	2.39	100.30	0.11	0.10	2.13	1.54	Wisconsin	Pleis.	25
1.59	2.06	8.03	100.39	0.13	6.35	1.50	0.89	Wisconsin	Pleis.	25
1.49	1.77	8.95	100.50	0.11	7.26	1.68	1.22	Wisconsin	Pleis.	25
1.91	2.62	1.63	100.60	0.12	0.04	1.47	0.78	Wisconsin	Pleis.	25
1.59	1.58	12.38	100.44	0.11	11.28	1.10	0.42	Wisconsin	Pleis.	25
CHRISTIAN COUNTY										
1.11	3.60	4.98	100.59	-	-	-	0.83	McLeansboro	Penn.	25
CLARK COUNTY										
-	-	3.32	-	-	-	-	-	McLeansboro	Penn.	5
-	-	2.42	-	-	-	-	-	McLeansboro	Penn.	5
1.06	2.82	6.77	100.28	-	-	-	0.80	McLeansboro	Penn.	25
CLAY COUNTY										
0.85	1.45	3.18	100.65	-	-	-	-	Illinoian	Pleis.	20
0.74	1.98	5.38	99.67	-	-	5.45	1.25	McLeansboro	Penn.	25
CLINTON COUNTY										
1.19	5.22	17.19	99.41	-	-	8.33	1.15	New Albany	Dev.-Miss.	22
0.91	3.03	6.09	100.55	-	-	-	0.98	McLeansboro	Penn.	25
COOK COUNTY										
1.28	2.53	13.70	100.14	-	9.51	-	0.68	Wisconsin	Pleis.	6
(Alk 4.0)	-	-	101.7	-	-	-	0.42	Wisconsin	Pleis.	6
0.56	3.57	13.79	100.7	0.62	-	-	0.32	Wisconsin	Pleis.	6
0.69	3.25	15.67	-	0.16	-	-	0.35	Wisconsin	Pleis.	6

Table 1. -

Petro- graphic No.	Location	Type* of Rock	SiO ₂	TiO ₂	Al ₂ O ₃	Fe ₂ O ₃	FeO	MgO	CaO
CRAWFORD COUNTY									
1421	SW SW NE 1-5N-12W	Sh	58.89	-	20.10	2.01	4.70	1.80	0.55
CUMBERLAND COUNTY									
1353A	NE NW SW 36-10S-9E	Sh	52.42	-	21.54	8.75	1.79	1.84	0.05
1346A	NW NW SW 2-9S-9E	Sh	57.32	-	19.12	5.69	2.47	1.81	0.41
EDGAR COUNTY									
L12	1 mi. NW of St. Aloysius Church, 14N-11W	Sh	58.90	-	19.09	8.11	-	3.52	1.56
L13	300 yds. N of St. Aloysius Church, 14N-11W	Sh	74.24	-	13.58	5.73	-	1.86	1.58
EDWARDS COUNTY									
262	Albion Brick Co. pit 1	Sh	51.50	1.49	24.51	2.73	3.89	1.70	0.96
K3	N $\frac{1}{2}$ 12-2S-10E	Sh	59.34	1.31	15.36	3.26	3.84	1.82	0.76
1326A	Albion Brick Co. pit	Sh	53.40	-	22.89	1.22	6.29	2.04	0.64
EFFINGHAM COUNTY									
1416	NW SW 1-6N-5E	Sh	59.81	-	19.20	5.56	2.87	2.18	0.78
E1	SW SW NE 6-7N-6E	L	82.77	0.71	7.60	2.18	0.40	0.46	0.42
E2	SW SW NE 6-7N-6E	L	80.12	1.24	8.75	2.64	0.45	0.56	0.37
E3	SW SW NE 6-7N-6E	L	69.90	0.79	14.37	5.50	0.42	1.16	0.43
E4	SW SW NE 6-7N-6E	L	71.24	0.82	13.52	5.26	0.31	1.04	0.55
E5	SW SW NE 6-7N-6E	T	74.66	0.80	12.17	3.60	0.40	0.94	0.80
E6	SW SW NE 6-7N-6E	T	81.07	0.64	9.37	2.29	0.29	0.54	0.60
E7	SW SW NE 6-7N-6E	T	80.95	0.59	9.61	2.52	0.26	0.67	0.72
E8	SW SW NE 6-7N-6E	T	81.82	0.60	9.46	1.94	0.24	0.48	0.66
E9	SW SW NE 6-7N-6E	T	80.76	0.55	9.96	2.12	0.24	0.63	0.68
E10	SW SW NE 6-7N-6E	T	78.98	0.59	10.86	2.46	0.25	0.60	0.78
E11	SW SW NE 6-7N-6E	T	79.01	0.51	10.09	3.60	0.19	0.72	0.68
E12	SW SW NE 6-7N-6E	T	77.37	0.47	9.30	6.10	0.20	0.68	0.55
E13	SW SW NE 6-7N-6E	T	81.25	0.50	8.43	3.35	0.31	0.56	0.75
E14	SW SW NE 6-7N-6E	T	79.24	0.48	9.21	3.95	0.30	0.80	0.68
E15	SW SW NE 6-7N-6E	T	63.38	0.44	7.88	3.19	0.65	4.42	6.86
E16	SW SW NE 6-7N-6E	T	61.34	0.38	8.16	1.17	0.98	4.30	9.05
E17	SW SW NE 6-7N-6E	T	59.78	0.44	7.97	1.41	1.26	4.07	9.48
FAYETTE COUNTY									
V1	SW NW 20-6N-1E	L	77.92	0.89	9.97	2.58	0.40	0.77	0.51
V2	SW NW 20-6N-1E	L	71.48	0.83	13.15	4.30	0.49	1.07	0.52

* Key to symbols:

Sh - shale Cl - clay Al - alluvium L - loess St - silt
 Df - drift Unc - underclay Col - colluvium T - till S - soil

Continued

Na ₂ O	K ₂ O	Ign.	Total	SO ₃	CO ₂	H ₂ O ⁺	H ₂ O ⁻	Unit	Age	Reference No.
CRAWFORD COUNTY										
0.82	2.75	7.79	99.41	-	-	5.55	0.74	McLeansboro	Penn.	25
CUMBERLAND COUNTY										
1.09	3.70	8.92	100.10	-	-	-	2.27	McLeansboro	Penn.	25
1.50	3.05	8.53	99.90	-	-	-	1.67	McLeansboro	Penn.	25
EDGAR COUNTY										
-	-	6.18	-	-	-	-	-	McLeansboro	Penn.	5
-	-	2.02	-	-	-	-	-	McLeansboro	Penn.	5
EDWARDS COUNTY										
0.93	3.77	8.38	99.86	-	-	7.82	0.99	McLeansboro	Penn.	19
0.80	3.82	7.89	-	0.16	-	-	0.29	McLeansboro	Penn.	3
0.86	3.52	8.91	99.78	-	-	6.17	0.85	McLeansboro	Penn.	25
EFFINGHAM COUNTY										
1.21	2.82	5.36	99.79	-	-	-	0.65	McLeansboro	Penn.	25
1.02	1.69	2.61	99.86	0.09	-	2.03	0.93	Peorian	Pleis.	25
0.99	1.76	2.74	99.62	0.07	-	2.76	1.14	Peorian	Pleis.	25
0.92	1.65	4.80	99.94	0.07	-	5.01	2.63	Peorian	Pleis.	25
1.02	1.79	4.22	99.77	0.06	-	4.48	2.65	Farmdale	Pleis.	25
1.30	1.98	3.28	99.93	0.08	-	3.59	1.80	Illinoian	Pleis.	25
1.20	1.45	2.57	99.84	0.07	-	2.70	1.38	Illinoian	Pleis.	25
1.08	1.47	2.68	100.68	0.10	-	2.80	1.85	Illinoian	Pleis.	25
0.94	1.36	2.51	100.01	0.06	-	2.53	1.49	Illinoian	Pleis.	25
1.10	1.35	2.99	100.38	0.09	-	2.99	1.73	Illinoian	Pleis.	25
0.79	1.27	3.34	99.92	0.05	-	3.28	1.75	Illinoian	Pleis.	25
0.93	1.37	3.36	100.46	0.07	-	3.47	1.95	Illinoian	Pleis.	25
0.93	1.45	3.39	100.44	0.07	-	3.54	1.71	Illinoian	Pleis.	25
0.90	1.82	2.09	99.96	0.04	-	2.20	0.76	Illinoian	Pleis.	25
0.93	2.04	2.54	100.17	0.06	-	2.74	0.70	Illinoian	Pleis.	25
1.03	1.77	10.68	100.30	0.06	-	2.42	0.32	Illinoian	Pleis.	25
0.95	1.80	12.22	100.35	0.09	-	2.24	0.23	Illinoian	Pleis.	25
0.86	1.80	12.54	99.61	0.33	-	1.97	0.32	Illinoian	Pleis.	25
FAYETTE COUNTY										
1.27	2.43	3.75	100.49	0.03	-	3.30	0.81	Peorian	Pleis.	25
1.07	2.46	5.30	100.67	0.02	-	4.88	2.04	Peorian	Pleis.	25

Table 1. -

Petro- graphic No.	Location	Type* of		SiO ₂	TiO ₂	Al ₂ O ₃	Fe ₂ O ₃	FeO	MgO	CaO
		Rock								
FAYETTE COUNTY (continued)										
V3	SW NW 20-6N-1E	L		71.20	0.89	13.14	4.62	0.43	1.11	0.47
V4	SW NW 20-6N-1E	L		74.08	0.81	11.78	3.89	0.42	0.95	0.64
V5	SW NW 20-6N-1E	S		76.00	0.74	11.24	3.68	0.33	0.91	0.65
V6	SW NW 20-6N-1E	S		78.20	0.73	9.96	3.46	0.28	0.80	0.59
V7	SW NW 20-6N-1E	S		80.72	0.62	9.02	2.93	0.23	0.65	0.54
V9	SW NW 20-6N-1E	S		79.72	0.54	9.34	3.36	0.24	0.68	0.44
V11	SW NW 20-6N-1E	S		83.31	0.35	7.62	3.13	0.30	0.56	0.32
V12	SW NW 20-6N-1E	S		81.89	0.32	6.97	4.69	0.30	0.77	0.45
V14	SW NW 20-6N-1E	S		82.35	0.30	7.31	3.82	0.33	0.73	0.65
V15	SW NW 20-6N-1E	S		85.96	0.28	5.76	2.25	0.65	0.83	0.99
V16	SW NW 20-6N-1E	S		43.54	0.19	4.11	1.78	0.69	7.16	19.46
1427	St. Elmo Brick & Tile pit	Sh		54.81	-	24.43	2.08	4.47	2.35	0.55
FORD COUNTY										
14700F	SE SE 15-23N-14W	S		47.21	-	21.47	10.73	-	3.62	0.21
DS101	NW 17-23N-10E	T		51.03	-	12.95	4.90	-	5.92	7.35
FRANKLIN COUNTY										
Col 2-a	New Orient mine	Cl		43.80	0.00	39.36	0.82	-	0.16	1.17
FULTON COUNTY										
R214	NE SW SE 31-6N-5E	Sh		63.59	1.21	18.02	5.60	-	1.64	0.69
R215	SE SE NW 7-5N-5E	Sh		68.25	1.19	15.36	4.52	-	1.69	0.65
217	SE 21-6N-3E	Sh		53.06	0.81	26.86	2.42	3.00	2.51	0.76
F119	S $\frac{1}{2}$ 2-5N-1E	Sh		48.05	1.42	29.24	1.36	2.97	1.99	0.59
F121	S $\frac{1}{2}$ 2-5N-1E	Sh		48.13	1.37	31.03	1.39	1.13	1.17	0.69
F124	S $\frac{1}{2}$ 2-5N-1E	Sh		46.56	1.57	29.82	3.54	1.51	1.29	0.14
1322A	Near Liverpool, Peoria Brick & Tile pit	Sh		69.89	-	17.03	2.70	1.13	1.50	0.33
1350A	Truax Coal Co. pit	Sh		62.37	-	18.47	1.21	4.44	2.10	0.40
1531	Morgan Coal Co. Big Ten mine	Unc		53.38	-	18.57	4.09	2.66	2.69	3.78
GREENE COUNTY										
F18	30-12N-12W	Cl		66.88	1.18	21.87	2.23	-	-	-
F19	30-12N-12W	Cl		68.12	1.16	20.08	1.76	-	-	-
F16	SW 30-12N-11W	Cl		61.34	1.22	25.76	2.14	-	-	-
F6	SW 30-12N-11W	Cl		67.37	1.32	21.69	1.59	-	-	-
R106	NW NE SW 2-10N-13W	Cl		60.14	2.07	22.08	4.15	-	0.78	0.82
241	White Hall Sewerpipe & Stoneware Co. pit	Sh		51.19	1.44	22.31	8.00	1.66	2.53	1.25
242	White Hall Sewerpipe & Stoneware Co. pit	Sh		51.02	1.39	25.30	2.04	5.06	2.25	0.87

* Key to symbols:

Sh - shale Cl - clay Al - alluvium L - loess St - silt
Df - drift Unc - underclay Col - colluvium T - till S - soil

Continued

Na ₂ O	K ₂ O	Ign.	Total	SO ₃	CO ₂	H ₂ O+	H ₂ O-	Unit	Age	Reference No.
FAYETTE COUNTY (continued)										
1.07	2.43	5.21	100.57	0.02	-	4.84	2.14	Peorian	Pleis.	25
1.31	2.19	4.46	100.53	0.02	-	4.21	1.44	Farmdale	Pleis.	25
1.52	2.16	3.44	100.67	0.05	-	3.17	1.95	Illinoian	Pleis.	25
1.40	1.93	3.16	100.51	0.04	-	2.88	1.75	Illinoian	Pleis.	25
1.18	1.83	2.79	100.51	0.11	-	2.58	1.27	Illinoian	Pleis.	25
0.84	1.62	3.43	100.21	0.05	-	3.36	1.48	Illinoian	Pleis.	25
0.65	1.04	3.10	100.38	0.08	-	3.06	1.01	Illinoian	Pleis.	25
0.73	1.05	3.11	100.28	0.07	-	3.04	0.67	Illinoian	Pleis.	25
1.27	1.33	2.44	100.53	0.06	-	2.51	0.58	Illinoian	Pleis.	25
1.23	1.21	1.29	100.45	0.06	-	1.35	0.10	Illinoian	Pleis.	25
1.03	0.69	22.12	100.77	0.06	-	1.06	0.08	Illinoian	Pleis.	25
0.71	3.61	7.24	100.29	-	-	-	1.55	McLeansboro	Penn.	25
FORD COUNTY										
-	5.78	10.99	100.01	-	-	6.17	3.80	Wisconsin	Pleis.	15
-	-	13.56	95.71	-	9.54	-	1.05	Wisconsin	Pleis.	6
FRANKLIN COUNTY										
-	-	15.40	100.71	-	-	-	-	Brereton	Penn.	14
FULTON COUNTY										
0.97	2.77	5.65	100.32	0.18	1.17	-	0.43	Purinton	Penn.	6
1.41	2.49	4.56	100.22	0.10	0.37	-	0.22	Canton	Penn.	6
0.71	3.30	6.47	99.90	-	-	6.45	0.96	Canton	Penn.	25
0.55	4.65	8.95	99.77	-	-	8.39	1.75	Greenbush	Penn.	22
0.41	2.69	11.82	99.83	-	-	11.24	1.09	Wiley	Penn.	22
0.51	3.95	10.99	99.88	-	-	10.46	1.07	Delong	Penn.	22
1.47	2.34	3.76	100.15	-	-	3.62	1.06	Canton	Penn.	25
1.45	3.08	6.23	99.75	-	-	-	0.73	Canton	Penn.	25
0.96	3.84	9.97	99.94	7.84	3.02	4.42	4.87	St. David	Penn.	25
GREENE COUNTY										
-	-	6.66	99.66	-	-	-	0.84	Cheltenham	Penn.	1
-	-	6.31	98.62	-	-	-	1.19	Cheltenham	Penn.	1
-	-	6.88	98.80	-	-	-	1.46	Cheltenham	Penn.	1
-	-	6.17	99.52	-	-	-	1.38	Cheltenham	Penn.	1
0.05	0.55	9.28	99.92	0.00	0.19	-	1.82	Cheltenham	Penn.	25
0.59	4.10	6.98	100.05	-	-	6.46	0.61	Purinton	Penn.	19
0.46	2.79	8.99	100.17	-	-	7.32	1.23	Purinton	Penn.	19

Table 1. -

Petro- graphic No.	Location	Type* of Rock	SiO ₂	TiO ₂	Al ₂ O ₃	Fe ₂ O ₃	FeO	MgO	CaO
GREENE COUNTY (continued)									
248	NE NE 2-10N-12W	Cl	53.31	1.60	29.79	1.59	-	0.87	0.54
1355A	SE NE 30-12N-11W	Sh	50.09	-	24.38	10.32	1.17	2.44	0.60
GRUNDY COUNTY									
1	NW NE 10-33N-8E	Cl	53.48	-	24.53	7.26	-	1.61	1.32
3		Cl	63.48	-	23.30	2.61	-	1.36	0.86
2	Gen. 11-33N-8E	Cl	62.32	-	25.36	1.96	-	1.00	1.39
207	Ill. Clay Prod. Co. pit	Cl	50.48	1.90	31.48	1.01	0.47	0.79	0.34
212	Ill. Clay Prod. Co. pit	Cl	49.81	1.89	32.75	1.30	0.63	0.64	0.69
455	Ill. Clay Prod. Co. pit	Cl	52.45	1.46	32.01	0.04	0.71	0.81	None
456	Ill. Clay Prod. Co. pit	Cl	52.03	1.59	32.91	0.33	0.66	0.90	None
457	Ill. Clay Prod. Co. pit	Cl	51.77	2.03	32.30	0.68	0.58	0.94	None
458	Ill. Clay Prod. Co. pit	Cl	53.24	2.12	30.93	0.39	0.80	0.83	None
459	Ill. Clay Prod. Co. pit	Cl	53.94	1.90	29.91	0.78	0.80	1.17	None
460	Ill. Clay Prod. Co. pit	Cl	52.88	1.83	29.47	1.23	0.83	1.22	None
461	Ill. Clay Prod. Co. pit	Cl	52.71	2.11	29.09	1.16	0.96	1.15	None
866	Ill. Clay Prod. Co. pit	Cl	59.40	1.48	20.74	4.50	-	1.09	0.92
Grund- ite	Ill. Clay Prod. Co. pit	Cl	57.28	0.90	19.07	5.63	-	1.64	0.62
ER2	Ill. Clay Prod. Co. pit	Cl	50.77	-	24.42	4.21	1.69	2.77	0.47
ER1	Ill. Clay Prod. Co. pit	Cl	52.79	-	24.99	4.68	1.10	2.70	0.09
CFE	Ill. Clay Prod. Co. pit	Cl	63.80	-	22.12	2.44	-	0.16	0.92
W119a	Ill. Clay Prod. Co. pit	Sh	48.16	1.17	15.83	5.29	-	3.72	7.48
DS94	26-34N-8E	Sh	35.26	-	13.61	4.52	-	4.67	17.26
1401	SW 11-33N-6E	Sh	60.52	-	17.39	6.01	3.84	1.56	0.67
1331A	SW SW 12-31N-8E	Sh	58.94	-	22.03	1.72	3.55	2.29	0.27
1331B	SW SW 12-31N-8E	Sh	55.53	-	17.53	2.45	1.82	2.20	6.75
1331F	SW SW 12-31N-8E	Sh	54.54	-	21.62	6.26	3.40	2.28	0.31
DS91	SE NW SE 30-33N-6E	T	49.58	-	13.25	4.45	-	6.50	9.43
HANCOCK COUNTY									
L3	3/4 mi. W. of Niota		76.00	-	9.63	-	-	1.58	1.80
1408	SW SW 26-3N-5W	Sh	55.10	-	21.25	6.97	2.96	2.03	0.24
HARDIN COUNTY									
B21	SW SE 26-11S-7E	Cl	56.96	0.37	23.47	8.84	-	0.82	0.53
578	SE SW 11-12S-7E	Sh	50.94	0.50	24.85	5.86	1.01	2.78	1.65
NF559	SE SE NW 30-12S-8E	L	78.63	-	10.94	3.72	-	0.69	0.61
JACKSON COUNTY									
430	NE 4-7S-4W	Cl	57.81	1.09	25.50	2.06	1.13	1.11	0.45
429	NE 4-7S-4W	Cl	58.35	0.99	25.52	2.31	0.97	1.23	0.47
428	NE 4-7S-4W	Cl	59.11	1.00	24.79	2.73	0.69	1.23	0.58

* Key to symbols:

Sh - shale Cl - clay Al - alluvium L - loess St - silt
Df - drift Unc - underclay Col - colluvium T - till S - soil

Continued

Na ₂ O	K ₂ O	Ign.	Total	SO ₃	CO ₂	H ₂ O ⁺	H ₂ O ⁻	Unit	Age	Reference No.
GREENE COUNTY (continued)										
0.14	3.19	9.15	100.20	-	-	9.07	1.58	Cheltenham	Penn.	16
0.57	4.14	6.56	100.27	-	-	-	2.08	Purington	Penn.	25
GRUNDY COUNTY										
(Alk 0.58)		8.11	-	3.11	-	-	-	Tradewater	Penn.	12
(Alk 0.23)		7.02	-	1.14	-	-	-	Tradewater	Penn.	12
-	-	7.14	-	1.00	-	-	-	Tradewater	Penn.	12
0.20	1.86	-	100.46	-	-	10.38	1.90	Tradewater	Penn.	24
0.19	1.25	10.61	99.76	-	-	10.11	1.54	Tradewater	Penn.	25
None	1.22	11.34	100.04	-	-	11.15	3.32	Tradewater	Penn.	16
0.31	1.77	10.32	100.82	-	-	10.14	1.68	Tradewater	Penn.	16
0.33	2.20	9.65	100.48	-	-	9.29	1.62	Tradewater	Penn.	16
0.30	2.16	9.74	100.51	-	-	9.45	2.81	Tradewater	Penn.	16
0.05	2.83	9.06	100.44	-	-	8.72	1.72	Tradewater	Penn.	16
0.46	2.90	9.31	100.13	-	-	8.73	2.80	Tradewater	Penn.	16
0.31	3.45	9.32	100.26	-	-	8.96	2.09	Tradewater	Penn.	16
0.34	3.84	7.60	-	-	-	-	-	Tradewater	Penn.	8
(Alk 4.34)		9.51	100.75	1.76	-	-	-	Tradewater	Penn.	17
0.17	5.65	10.05	100.20	-	-	8.32	3.11	Tradewater	Penn.	17
0.20	5.86	7.14	99.55	-	-	6.83	5.56	Tradewater	Penn.	17
-	-	10.28	99.72	-	0.00	-	1.93	Tradewater	Penn.	25
0.09	4.71	13.55	100.28	0.28	6.94	-	0.34	Maquoketa	Ord.	25
-	-	20.32	-	-	17.10	-	0.58	Maquoketa	Ord.	6
1.28	2.86	5.46	99.59	-	-	-	0.35	Francis Cr.	Penn.	25
1.11	4.24	5.49	99.64	-	-	5.10	1.19	McLeansboro	Penn.	25
0.93	3.06	9.48	99.75	-	-	4.12	2.09	McLeansboro	Penn.	25
1.06	4.19	5.75	99.41	-	-	-	0.94	McLeansboro	Penn.	25
-	-	16.75	99.96	-	12.69	-	0.48	Wisconsin	Pleis.	6
HANCOCK COUNTY										
-	-	3.62	-	-	-	-	-		Pleis.	5
1.07	3.60	6.85	100.07	-	-	-	1.27	Francis Cr.	Penn.	25
HARDIN COUNTY										
0.30	1.56	7.92	100.77	-	-	-	-	Residual	Recent	20
0.10	6.62	6.23	100.54	-	-	5.68	2.54	Renault	Miss.	22
0.81	1.85	3.21	-	-	0.00	-	-	Wisconsin	Pleis.	26
JACKSON COUNTY										
0.13	2.22	8.31	99.81	-	0.05	8.01	3.08	Tradewater	Penn.	16
0.06	2.37	8.09	100.36	-	0.04	8.05	3.37	Tradewater	Penn.	16
0.05	2.62	7.94	100.74	-	-	7.86	4.77	Tradewater	Penn.	16

Table 1. -

Petro- graphic No.	Location	Type* of Rock	SiO ₂	TiO ₂	Al ₂ O ₃	Fe ₂ O ₃	FeO	MgO	CaO
JACKSON COUNTY (continued)									
427	NE 4-7S-4W	Cl	55.44	1.38	23.93	3.39	0.46	1.95	2.02
268	Murphysboro Paving Co. pit	Brick Sh	51.45	1.80	26.82	2.07	3.01	1.89	0.65
1336A	NW SW NW 10-9S-2W	Sh	62.30	-	20.72	4.61	1.14	1.34	0.22
1336B	SE NE NE 18-9S-2W	Sh	60.08	-	18.77	2.13	4.53	1.49	0.54
JASPER COUNTY									
1411	SE SE SE 35-7N-9E	Sh	56.56	-	22.31	5.72	2.32	2.30	0.48
JEFFERSON COUNTY									
1095	12-4S-4E	Sh	51.86	1.01	20.70	4.21	2.28	5.46	0.61
JO DAVIESS COUNTY									
H21	West end of Great Western RR tunnel	Sh	48.41	-	18.31	6.06	-	3.13	5.73
DS71S		Sh	48.93	-	10.43	3.68	-	6.80	10.85
NF99	SE SW SW 15-29N-3E	Sh	29.76	-	7.95	2.82	-	12.21	17.74
JOHNSON COUNTY									
T2	SE NW 1-13S-4E	Sh	55.46	-	16.20	5.28	-	2.82	3.66
575A	W $\frac{1}{2}$ SE 12-13S-4E	Sh	50.89	0.55	28.26	4.71	0.50	2.12	1.22
575B	W $\frac{1}{2}$ SE 12-13S-4E	Sh	51.23	0.50	27.34	4.27	0.89	2.09	1.35
576	SE NW 1-13S-4E	Sh	53.83	0.35	23.74	2.62	1.62	3.90	1.61
NF478D	NE SW NE 15-12S-2E	Sh	52.60	-	15.45	4.90	-	1.87	10.51
NF478E	NE SW NE 15-12S-2E	Sh	57.62	-	16.95	5.09	-	2.62	4.98
NF551S	NE NW SE 1-14S-2E	Sh	46.74	-	10.61	3.49	-	2.52	16.81
NF554S	NE NE NE 17-13S-3E	Sh	58.70	-	23.28	4.80	-	1.61	0.47
NF520	SW SW NE 12-13S-4E	Sh	60.42	-	15.76	10.50	-	1.66	2.47
T4	NE SW 1-13S-4E	Sh	39.20	-	12.11	4.25	-	3.19	16.82
KANE COUNTY									
NF39	NE SW 27-39N-8E	Sh	45.4	-	10.30	1.80	-	8.8	11.7
NF42	NE NE 9-40N-8E	Sh	43.4	-	(R ₂ O ₃ 17.8)	-	-	7.4	10.7
NF46	SE NW NW 10-40N-8E	Sh	29.4	-	(R ₂ O ₃ 13.5)	-	-	11.6	16.6
DS98	NW 10-40N-8E	Sh	40.75	-	12.97	3.56	-	7.62	16.98
KANKAKEE COUNTY									
775	Kankakee Brick & Tile Co. pit	T	52.36	0.70	14.70	3.02	-	4.38	6.38
1324B	Northern Illinois Coal Corp. pit 11	Sh	57.80	-	20.24	4.45	4.44	2.08	0.39

* Key to symbols:

Sh - shale Cl - clay Al - alluvium L - loess St - silt
Df - drift Unc - underclay Col - colluvium T - till S - soil

Continued

Na ₂ O	K ₂ O	Ign.	Total SO ₃	CO ₂	H ₂ O+	H ₂ O-	Unit	Age	Reference No.	
JACKSON COUNTY (continued)										
0.33	3.21	7.94	100.05	-	-	7.69	5.72	Tradewater	Penn.	16
0.29	5.15	7.23	100.36	-	-	7.31	0.87	Tradewater	Penn.	19
0.70	3.15	5.79	99.97	-	-	5.46	0.77	Tradewater	Penn.	25
0.55	3.40	8.49	99.98	-	-	4.78	0.86	Tradewater	Penn.	25
JASPER COUNTY										
1.31	3.33	6.54	100.87	-	-	-	1.01	McLeansboro	Penn.	25
JEFFERSON COUNTY										
0.56	5.94	7.20	99.83	-	-	6.45	3.06	Ste. Gen.	Miss.	22
JO DAVIESS COUNTY										
(Alk 5.65)		12.79	-	-	-	-	0.79	Maquoketa	Ord.	3
-	-	16.71	-	-	-	-	0.66	Maquoketa	Ord.	6
-	-	27.15	97.63	-	-	-	0.24	Maquoketa	Ord.	6
JOHNSON COUNTY										
-	-	-	-	-	-	-	-	Menard	Miss.	6
0.31	3.93	8.10	100.59	-	-	8.02	4.03	Vienna	Miss.	22
0.44	4.05	8.23	100.39	-	-	8.18	2.17	Vienna	Miss.	22
0.39	5.67	6.65	100.38	-	-	6.44	2.82	Menard	Miss.	22
0.12	3.04	11.79	-	-	7.58	-	-	Kinkaid	Miss.	26
0.22	3.71	8.42	-	-	3.55	-	-	Kinkaid	Miss.	26
0.46	2.07	17.14	-	-	13.92	-	-	Renault	Miss.	26
0.21	3.83	7.95	-	-	0.00	-	-	Tar Springs	Miss.	26
0.20	2.11	7.28	-	-	1.58	-	-	Vienna	Miss.	26
-	-	-	-	-	-	-	-	Menard	Miss.	26
KANE COUNTY										
(Alk 4.6)		18.7	-	-	-	-	0.28	Niagaran	Sil.	6
(Alk 4.6)		17.3	101.2	-	-	-	0.29	Maquoketa	Ord.	18
(Alk 3.2)		25.8	100.1	-	-	-	2.54	Maquoketa	Ord.	6
-	-	17.87	99.75	-	14.81	-	0.79	Niagaran	Sil.	6
KANKAKEE COUNTY										
0.61	5.30	12.12	-	-	-	-	-	Wisconsin	Pleis.	25
1.24	3.43	5.54	99.61	-	-	-	0.59	Francis Cr.	Penn.	25

Table 1. -

Petro- graphic No.	Location	Type* of Rock	SiO ₂	TiO ₂	Al ₂ O ₃	Fe ₂ O ₃	FeO	MgO	CaO
KNOX COUNTY									
K6	SW 17-11N-2E	Sh	63.62	0.96	16.28	3.02	2.90	1.44	0.63
240	Purington Paving Brick Co. pit	Sh	57.21	2.16	18.97	4.66	2.89	2.17	0.92
1347A	Purington Brick Co. pit	Sh	63.73	-	18.54	5.92	1.33	1.71	0.37
215	SW 35-13N-4E	Sh	47.18	1.55	24.95	8.30	2.15	2.26	0.87
LA SALLE COUNTY									
13a	N $\frac{1}{2}$ SW 9-33N-2E	C1	56.00	2.13	27.72	2.00	-	0.35	0.57
V5	Utica	C1	55.86	1.06	27.09	3.09	-	-	-
V4	NE 20-33N-2E	C1	52.80	0.82	29.44	1.70	-	-	-
V11	SE 21-33N-3E	C1	56.28	1.28	26.68	3.24	-	-	-
206	Chicago Retort & Fire- brick Co. pit	C1	49.84	1.45	33.66	1.04	0.69	0.47	0.62
450	NW SW 5-33N-4E	C1	55.21	1.81	30.48	0.18	0.75	0.68	None
451	NW SW 5-33N-4E	C1	51.21	2.05	33.00	0.64	0.71	0.71	None
452	NW SW 5-33N-4E	C1	51.32	1.34	33.59	0.78	0.52	0.63	None
453	NW SW 5-33N-4E	C1	48.30	2.02	34.49	1.06	0.61	0.67	None
454	NW SW 5-33N-4E	C1	49.02	1.59	34.94	1.11	0.34	0.62	None
211	NE SW SW 9-32N-2E	C1	56.00	2.13	27.72	2.00	-	0.35	0.57
W1	SW SW SW 11-33N-1E	C1	64.41	1.04	17.51	4.47	-	0.95	0.17
W5	SW SW SW 11-33N-1E	C1	58.65	0.94	21.00	4.32	-	1.05	1.93
W8	SE SE NW 14-33N-1E	C1	49.92	1.00	16.97	8.57	-	2.61	5.80
	Marquette Portland Cement Co.	C1	54.30	-	19.33	5.57	-	2.57	3.29
	Chicago Portland Cement Co.	C1?	53.12	-	20.60	4.09	-	2.24	4.02
W28	NW SE SE 10-33N-4E	C1	57.42	1.22	24.73	2.29	-	0.80	0.65
W29	NW SE SE 10-33N-4E	C1	58.56	1.20	23.88	2.80	-	0.22	0.67
W13	SE SE NW 9-34N-4E	T	40.36	0.58	11.80	3.60	-	5.11	13.69
4	8-33N-2E	Sh	11.89	-	11.61	1.35	-	20.38	29.51
5	8-33N-2E	Sh	27.60	-	10.60	0.80	-	17.26	33.04
204	NE SE 6-33N-4E	Sh	54.61	0.90	26.75	1.45	2.08	2.16	0.48
E1b	SE NW 14-33N-1E	Sh	49.02(R ₂ O ₃	20.14)	-	-	-	2.10	13.82
W7	SE SE NW 14-33N-1E	Sh	56.40	0.92	18.97	8.86	-	2.13	2.32
H17	LaSalle Press Brick Co.	Sh	59.56	-	12.64	13.56	-	2.75	2.22
E6e	SE 25-33N-1E	Sh	53.48(R ₂ O ₃	22.36)	-	-	-	1.78	7.64
W27	NW SE SE 10-33N-4E	Sh	56.11	1.01	23.51	5.35	-	1.42	1.36
288	SE 18-33N-3E	Sh**	55.54	3.04	25.61	0.53	1.76	1.09	0.51
W79	SW NE SE 18-33N-3E	Sh	55.64	1.00	23.67	4.70	-	1.77	0.31
B36	Sen. NW 32-34N-4E	Sh†	58.27	3.37	21.27	1.63	1.73	1.23	0.94
W18	SE NE NW 32-34N-4E	Sh	61.11	1.13	20.26	4.64	-	1.54	0.93
K7	SW NE 35-31N-3E	Sh	59.86	1.91	17.43	1.42	5.10	2.32	1.05
1324A	H. K. Porter pit	Sh	57.44	-	24.81	1.82	1.60	1.89	0.39

* Key to symbols:

Sh - shale Cl - clay Al - alluvium L - loess St - silt
 Df - drift Unc - underclay Col - colluvium T - till S - soil

** P₂O₅ 0.47† P₂O₅ 0.80

Continued

Na ₂ O	K ₂ O	Ign.	Total SO ₃	CO ₂	H ₂ O ⁺	H ₂ O ⁻	Unit	Age	Reference No.	
KNOX COUNTY										
1.50	2.60	5.88	-	0.11	-	-	0.96	Purington	Penn.	3
0.93	3.27	6.77	99.95	-	-	5.98	0.27	Purington	Penn.	19
1.39	2.91	4.03	99.93	-	-	-	0.88	Purington	Penn.	25
0.51	4.03	8.28	100.08	-	-	7.94	0.46	Canton	Penn.	22
LA SALLE COUNTY										
0.11	2.13	9.75	100.76	-	-	9.46	2.66	Cheltenham	Penn.	16
-	-	9.18	98.04	-	-	-	1.76	Cheltenham	Penn.	1
-	-	8.84	97.97	-	-	-	2.37	Cheltenham	Penn.	1
-	-	10.28	99.50	-	-	-	1.74	Cheltenham	Penn.	1
0.11	0.21	12.13	100.22	-	-	12.21	1.24	Cheltenham	Penn.	7
0.10	0.72	10.71	100.64	-	-	10.07	2.06	Cheltenham	Penn.	16
0.08	0.57	11.68	100.65	-	-	11.15	3.01	Cheltenham	Penn.	16
0.10	0.55	11.72	100.55	-	-	11.35	2.05	Cheltenham	Penn.	16
0.31	0.55	12.50	100.51	-	-	12.33	2.85	Cheltenham	Penn.	16
0.07	0.70	12.22	100.61	-	-	11.88	1.36	Cheltenham	Penn.	16
0.11	2.13	9.75	100.76	-	-	9.46	2.66	Cheltenham	Penn.	7
0.56	3.35	6.95	100.26	0.85	0.03	-	0.53	Cheltenham	Penn.	25
0.63	2.28	9.17	100.28	0.31	1.37	-	1.00	McLeansboro	Penn.	25
0.53	3.39	11.02	99.81	Trace	3.22	-	1.91	McLeansboro	Penn.	25
-	-	-	-	-	-	-	-	McLeansboro	Penn.	2
-	-	13.70	-	-	-	-	-	McLeansboro	Penn.	2
0.00	0.82	12.52	100.57	0.12	0.19	-	1.85	Cheltenham	Penn.	7
0.00	0.89	11.63	100.70	0.85	-	-	2.07	Cheltenham	Penn.	7
0.54	2.93	21.48	100.09	Trace	16.45	-	2.09	Wisconsin	Pleis.	7
-	-	-	-	-	-	-	-	LaSalle	Penn.	2
-	-	-	-	-	-	-	-	LaSalle	Penn.	2
0.83	4.84	6.69	100.79	-	-	6.06	0.85	Francis Cr.	Penn.	7
-	-	15.46	-	-	-	-	-	LaSalle	Penn.	5
0.85	3.21	6.90	100.56	0.00	1.06	-	0.35	LaSalle	Penn.	6
(Alk 4.82)	-	6.02	-	-	-	-	3.70	McLeansboro	Penn.	3
-	-	14.66	-	-	-	-	-	McLeansboro	Penn.	5
0.41	4.08	6.70	100.19	0.24	1.25	-	0.51	Francis Cr.	Penn.	7
0.70	3.64	7.33	100.22	-	-	-	0.63	Francis Cr.	Penn.	7
0.44	4.66	7.10	99.97	0.68	0.07	-	0.69	Francis Cr.	Penn.	7
0.93	3.93	5.91	100.01	-	-	-	0.25	Francis Cr.	Penn.	7
0.67	4.26	5.66	100.25	0.05	0.96	-	0.30	Francis Cr.	Penn.	7
0.18	2.80	6.35	98.75	0.13	-	-	0.20	Carbondale	Penn.	3
0.59	5.15	6.02	99.71	-	-	5.32	1.34	Francis Cr.	Penn.	25

Table 1. -

Petro- graphic No.	Location	Type*		SiO ₂	TiO ₂	Al ₂ O ₃	Fe ₂ O ₃	FeO	MgO	CaO
		Rock	of							
LA SALLE COUNTY (continued)										
1403	Ill. Valley Min. Co. pit	Sh		54.42	-	25.74	4.81	1.45	1.68	0.36
1397	Ill. Valley Min. Co. pit	Unc		66.15	-	20.22	3.56	0.34	0.52	0.12
1485	SW NE SW 8-32N-2E	Cl		64.55	-	20.36	4.23	0.94	0.50	0.29
1486	NW NE SW 8-32N-2E	Cl		59.38	-	24.48	3.40	0.61	0.91	0.54
1497	NE NW NE 26-33N-2E	Cl		61.40	-	27.15	1.74	0.52	0.16	0.04
1499A	SE NW SE 25-33N-2E	Cl		61.35	-	26.04	1.81	0.60	0.58	0.34
1506	NW 22-33N-3E	Cl		57.56	-	29.74	1.64	0.45	0.38	0.25
1527	SE NW SE 26-33N-2E	Cl		62.34	-	23.00	3.41	0.79	0.75	0.16
1454	SE SW 11-33N-4E	Sh		57.81	-	21.98	1.70	4.71	2.05	0.74
LAWRENCE COUNTY										
1426	SE SW NW 5-3N-11W	Sh		57.23	-	20.92	7.61	1.20	1.73	0.43
LEE COUNTY										
DS71	SW 27-22N-9E	L		74.00	-	14.00	4.00	-	-	-
	NW 27-22N-9E	T		45.91	-	13.62	4.03	-	6.60	12.06
LIVINGSTON COUNTY										
1321A	Diller Clay pit	T		53.71	-	13.73	2.78	1.86	4.92	6.38
P5	Cen. E. line 25-27N-4E	?		58.74	-	16.33	6.45	-	0.06	2.12
	SE NE 16-28N-5E	S		67.00	-	12.38	4.30	-	0.49	1.80
P1	SW NE 16-28N-5E	T		77.72	-	5.31	4.31	-	0.06	0.84
205	NW NE 18-30N-4E	Cl		51.96	1.72	30.60	1.32	0.80	1.09	0.97
202	NW NW 7-30N-4E	Sh		49.50	1.17	27.60	2.10	3.37	2.66	1.49
K15	NW NE 12-30N-3E	Sh		58.03	1.02	17.72	2.91	5.77	1.43	1.42
MACOUPIN COUNTY										
1407	NE NW NE 9-9N-7W	Sh		58.70	-	21.01	8.39	1.10	1.71	0.61
405	NE NW 2-9N-7W	Cl		57.01	1.15	22.23	2.74	2.33	3.90	1.13
406	NE NW 2-9N-7W	Cl		58.36	1.09	21.45	2.99	1.92	3.79	1.08
407	NE NW 2-9N-7W	Cl		59.51	1.10	21.55	2.14	2.10	3.45	1.29
408	NE NW 2-9N-7W	Cl		51.72	1.05	18.74	2.25	2.11	3.26	7.20
409	NE NW 2-9N-7W	Cl		49.39	1.00	20.32	1.90	2.31	3.26	7.92
229	Carlinsville Tile Co. pit	Sh		47.89	1.60	25.99	8.61	0.90	2.48	0.94
MADISON COUNTY										
271	East Alton	Cl		50.10	1.57	33.76	1.24	0.46	0.52	0.49
393	Alton Brick Co. mine, Alton	Cl		56.92	1.40	26.80	2.51	0.35	0.51	0.17
	Alton Brick Co. mine, Alton	Cl		52.00	-	27.46	2.62	-	0.40	1.01
K1	Alton Brick Co. pit, Alton	Sh		63.36	1.00	15.43	1.80	4.02	1.58	0.93

* Key to symbols:

Sh - shale Cl - clay Al - alluvium L - loess St - silt
 Df - drift Unc - underclay Col - colluvium T - till S - soil

Continued

Na ₂ O	K ₂ O	Ign.	Total	SO ₃	CO ₂	H ₂ O ⁺	H ₂ O ⁻	Unit	Age	Reference No.
LA SALLE COUNTY (continued)										
0.55	5.54	6.05	100.60	-	-	-	1.60	Francis Cr.	Penn.	25
0.08	0.94	8.21	100.14	-	-	-	1.14	Cheltenham	Penn.	25
0.13	1.51	7.99	100.50	-	0.00	-	0.97	Tradewater	Penn.	25
0.13	2.19	8.94	100.58	-	0.21	-	1.80	Tradewater	Penn.	25
0.08	0.76	8.96	100.81	-	0.00	-	1.64	Tradewater	Penn.	25
0.07	1.06	8.93	100.78	-	0.00	-	1.94	Liverpool	Penn.	25
0.07	0.71	10.04	100.84	-	0.00	-	1.52	Tradewater	Penn.	25
0.08	2.05	8.04	100.62	-	0.00	-	1.22	Tradewater	Penn.	25
1.08	4.12	6.61	100.80	-	1.25	-	0.90	Canton	Penn.	25
LAWRENCE COUNTY										
1.11	3.55	7.11	100.89	-	-	-	1.49	McLeansboro	Penn.	25
LEE COUNTY										
-	-	4.00	-	-	-	-	-	Wisconsin	Pleis.	4
-	-	16.96	99.18	-	13.98	-	0.9	Wisconsin	Pleis.	6
LIVINGSTON COUNTY										
0.53	3.84	11.68	99.43	-	-	3.61	0.90	Wisconsin	Pleis.	25
-	-	12.43	-	-	-	-	-	?	?	10
-	-	-	-	-	-	-	-	-	-	10
-	-	6.80	-	-	-	-	-	Wisconsin	Pleis.	5
0.31	1.94	10.00	100.71	-	-	9.98	2.10	McLeansboro	Penn.	7
0.51	4.57	7.74	100.70	-	-	7.66	1.32	Carbondale	Penn.	7
1.40	2.66	6.47	-	0.25	-	-	0.97	Carbondale	Penn.	3
MACOUPIN COUNTY										
1.11	3.01	5.23	100.87	-	-	-	1.14	Trivoli	Penn.	25
0.70	2.66	7.00	100.22	-	-	6.92	6.11	Macoupin	Penn.	16
0.29	2.34	6.71	100.02	-	0.08	6.55	4.24	Macoupin	Penn.	16
0.18	2.65	6.43	100.40	-	2.23	6.18	4.81	Macoupin	Penn.	16
0.32	2.52	10.60	99.77	-	5.07	5.67	3.40	Macoupin	Penn.	16
0.37	2.53	11.19	100.19	-	6.43	5.81	3.63	Macoupin	Penn.	16
0.41	3.81	7.76	100.39	-	-	7.75	1.98	Macoupin	Penn.	19
MADISON COUNTY										
0.32	0.45	11.05	99.96	-	-	11.13	3.34	Tradewater	Penn.	16
0.50	0.48	10.41	100.05	-	-	-	2.06	Tradewater	Penn.	25
0.31	0.60	12.35	100.77	4.02	-	-	-	Tradewater	Penn.	25
0.56	3.28	6.99	-	0.27	-	-	0.48	Purington	Penn.	3

Table 1. -

Petro- graphic No.	Location	Type* of Rock	SiO ₂	TiO ₂	Al ₂ O ₃	Fe ₂ O ₃	FeO	MgO	CaO
MADISON COUNTY (continued)									
1344A	Alton Brick Co. pit, Alton	Sh	54.50	-	20.61	4.39	5.88	2.05	0.37
270	Alton Brick Co. pit, Edwardsville	Sh	51.57	1.54	23.79	2.88	5.07	2.80	0.66
K5	Banner Clay Co., Edwardsville	Sh	63.43	1.07	16.89	1.52	4.24	2.11	1.00
K2	Glen Carbon	Sh	63.35	-	16.27	7.56	-	1.33	1.01
	Alton Brick Co., Alton	Sh	53.66	-	20.95	1.95	-	2.72	0.40
P7	SW NE SE 20-3N-8W	L	62.58	0.59	8.28	1.10	0.47	4.86	7.64
P8	SW NE SE 20-3N-8W	L	70.87	0.63	9.68	2.26	0.51	2.57	4.31
P11	SW NE SE 20-3N-8W	L	64.99	0.60	9.06	2.09	0.58	4.05	6.89
MARION COUNTY									
H1	SW SE 14-1N-4E	L	81.10	0.79	7.23	0.39	1.40	0.59	0.60
H2	SW SE 14-1N-4E	L	82.65	0.81	7.95	1.72	0.43	0.49	0.41
H3	SW SE 14-1N-4E	L	78.01	0.84	10.53	2.99	0.41	0.78	0.38
H4	SW SE 14-1N-4E	L	71.00	0.86	13.99	4.91	0.36	1.12	0.69
H5	SW SE 14-1N-4E	L	75.15	0.82	11.92	3.99	0.30	0.83	0.75
H6	SW SE 14-1N-4E	L	78.92	0.89	9.79	3.58	0.18	0.62	0.64
H7	SW SE 14-1N-4E	L	76.89	0.85	10.91	3.47	0.26	0.76	0.69
H8	SW SE 14-1N-4E	L	77.94	0.91	10.61	3.51	0.17	0.68	0.65
H9	SW SE 14-1N-4E	T	78.26	0.68	10.19	4.02	0.15	0.67	0.52
H10	SW SE 14-1N-4E	T	74.85	0.77	11.95	4.62	0.14	0.83	0.62
H11	SW SE 14-1N-4E	T	68.61	0.67	15.47	5.72	0.19	1.05	0.78
H12	SW SE 14-1N-4E	T	71.79	0.64	13.63	4.94	0.23	1.01	0.81
H13	SW SE 14-1N-4E	T	73.79	0.70	12.04	4.89	0.23	1.02	0.78
H14	SW SE 14-1N-4E	T	71.29	0.66	13.48	5.45	0.15	1.13	0.77
H15	SW SE 14-1N-4E	T	71.78	0.68	13.40	5.02	0.28	1.11	0.74
H16	SW SE 14-1N-4E	T	69.87	0.62	12.85	4.88	0.36	1.48	1.76
H17	SW SE 14-1N-4E	T	63.55	0.62	11.32	4.39	0.54	2.38	5.22
H18	SW SE 14-1N-4E	T	62.69	0.64	11.48	3.38	0.58	2.72	5.88
H19	SW SE 14-1N-4E	T	62.30	0.60	11.44	3.11	0.71	2.73	6.19
MARSHALL COUNTY									
W30	NW SE SW 23-12N-9E	Cl	58.97	1.22	20.48	3.73	-	2.29	0.16
225	SW 23-12N-9E	Cl**	54.88	3.08	26.38	0.81	0.90	0.85	0.27
401	S $\frac{1}{2}$ 9-11N-9E	Cl	56.40	1.18	22.84	2.02	1.63	1.72	0.94
402	S $\frac{1}{2}$ 9-11N-9E	Cl	58.16	1.06	22.85	1.92	1.53	1.95	1.20
403	S $\frac{1}{2}$ 9-11N-9E	Cl	49.67	0.90	18.59	1.74	2.69	2.85	7.04
404	S $\frac{1}{2}$ 9-11N-9E	Cl	41.73	0.88	15.10	1.11	2.30	2.21	15.23
W43	SE NW NE 27-12N-9E	Sh	46.49	0.85	21.84	10.86	-	6.35	2.00
1400	SE NW 23-12N-9E	Sh	51.57	-	22.76	11.05	1.56	1.77	0.33
1453	NW SE SW 23-12N-9E	Sh	52.04	-	20.62	2.64	6.91	2.50	1.41

* Key to symbols:

Sh - shale Cl - clay Al - alluvium L - loess St - silt
 Df - drift Unc - underclay Col - colluvium T - till S - soil

** P₂O₅ 0.54

Continued

Na ₂ O	K ₂ O	Ign.	Total	SO ₃	CO ₂	H ₂ O+	H ₂ O-	Unit	Age	Reference No.
MADISON COUNTY (continued)										
0.88	2.90	8.40	99.98	-	-	-	0.32	Purington	Penn.	25
0.74	3.83	6.96	99.84	-	-	6.94	0.66	Trivoli	Penn.	22
0.20	2.03	5.97	-	0.11	-	-	0.46	Trivoli	Penn.	3
(Alk 3.80)	4.75	-	-	-	-	-	0.31	Trivoli	Penn.	3
0.62	3.87	7.17	99.01	0.25	-	-	1.42	Summum	Penn.	25
1.35	1.79	11.34	100.00	0.09	9.95	1.38	0.62	Wisconsin	Pleis.	25
1.81	2.21	5.38	100.23	0.09	4.03	1.29	0.67	Wisconsin	Pleis.	25
1.66	2.01	8.70	100.63	0.11	7.47	1.33	0.67	Wisconsin	Pleis.	25
MARION COUNTY										
0.93	1.82	5.11	99.96	0.08	-	3.20	0.64	Peorian	Pleis.	25
0.93	1.95	2.84	100.18	0.08	-	2.62	0.40	Peorian	Pleis.	25
0.97	2.03	3.34	100.28	0.05	-	3.37	1.01	Peorian	Pleis.	25
1.21	1.99	4.43	100.56	0.03	-	4.68	3.73	Peorian	Pleis.	25
1.23	1.95	3.46	100.40	0.03	-	3.71	2.67	Peorian	Pleis.	25
1.10	1.61	3.03	100.36	0.03	-	3.52	1.86	Peorian	Pleis.	25
1.19	1.78	3.38	100.18	0.08	-	3.79	2.25	Farmdale	Pleis.	25
1.05	1.59	3.42	100.53	0.05	-	3.57	1.99	Farmdale	Pleis.	25
0.76	1.37	3.55	100.17	0.12	-	4.07	1.95	Illinoian	Pleis.	25
0.78	1.41	4.39	100.36	0.05	-	4.75	2.45	Illinoian	Pleis.	25
0.65	1.48	5.78	100.48	0.03	-	6.08	3.39	Illinoian	Pleis.	25
0.87	1.52	4.98	100.42	0.03	-	5.04	2.67	Illinoian	Pleis.	25
1.10	1.86	4.00	100.41	0.02	-	3.89	1.66	Illinoian	Pleis.	25
1.12	2.06	4.63	100.74	0.03	-	4.28	2.32	Illinoian	Pleis.	25
1.12	2.17	4.36	100.66	0.02	-	4.19	1.97	Illinoian	Pleis.	25
1.19	2.32	5.19	100.52	0.02	-	3.67	1.26	Illinoian	Pleis.	25
1.22	2.13	8.87	100.24	0.03	-	3.48	0.99	Illinoian	Pleis.	25
1.24	2.14	9.63	100.38	0.02	-	3.39	0.84	Illinoian	Pleis.	25
1.20	2.14	9.86	100.28	0.02	-	3.44	0.72	Illinoian	Pleis.	25
MARSHALL COUNTY										
0.14	2.96	9.11	100.60	1.54	0.09	-	0.63	Tradewater	Penn.	25
0.11	2.94	9.19	99.95	-	-	-	0.48	Tradewater	Penn.	25
0.26	4.42	8.53	99.94	-	-	7.06	3.20	Brereton	Penn.	16
0.31	4.86	6.33	100.17	-	0.05	5.40	6.12	Brereton	Penn.	16
0.34	3.80	12.37	99.99	-	6.62	4.31	4.27	Brereton	Penn.	16
0.30	3.21	17.81	99.98	-	12.52	4.58	2.21	Brereton	Penn.	16
-	-	11.60	99.99	-	0.37	-	0.92	McLeansboro	Penn.	6
1.01	3.36	6.48	99.89	-	-	-	1.17	McLeansboro	Penn.	25
0.99	3.17	10.02	100.30	-	2.58	-	1.73	McLeansboro	Penn.	25

Table 1. -

Petro- graphic No.	Location	Type*								
		Rock	SiO ₂	TiO ₂	Al ₂ O ₃	Fe ₂ O ₃	FeO	MgO	CaO	
MASSAC COUNTY										
D50	12-16S-6E	Cl	63.32	0.48	19.25	4.09	-	-	-	
D28	SW 1-15S-4E	Cl	66.04	1.60	22.00	1.60	-	-	-	
D30	SW 8-15S-4E	Cl	60.50	1.40	22.52	3.84	-	-	-	
D31	SW 8-15S-4E	Cl	69.46	1.64	18.82	1.32	-	-	-	
D29	N $\frac{1}{2}$ SW 8-15S-4E	Cl	71.58	1.40	18.31	1.51	-	-	-	
D3?	SE 33-14S-5E	Cl	64.88	1.26	21.54	1.86	-	-	-	
NF469	NE NW SW 27-15S-4E	Al	83.76	-	9.53	1.92	-	0.35	0.47	
NF552S	NE NW NW 3-14S-3E	Sh	33.99	-	10.30	3.72	-	2.09	24.60	
McDONOUGH COUNTY										
252	Colchester Brick & Tile Co. pit	Cl	51.43	1.56	29.02	1.88	2.66	1.52	0.62	
232	SE 7-5N-3W	Cl†	48.33	2.19	33.27	0.62	0.53	0.22	0.61	
H44	Dr. Russell Farm, Macomb	Cl	78.46	1.02	13.97	1.29	-	-	-	
H45	Dr. Russell Farm, Macomb	Cl	83.34	0.80	8.42	0.80	-	-	-	
H46	Dr. Russell Farm, Macomb	Cl	77.88	0.93	14.42	1.05	-	-	-	
1325A	Colchester Brick & Tile Co. pit	Sh	62.88	-	19.40	3.19	2.64	1.78	0.26	
1325B	Colchester Brick & Tile Co. pit	Sh	55.30	-	22.90	1.72	5.36	2.02	0.67	
MENARD COUNTY										
1330A	Springfield Clay Products pit	Sh	54.21	-	21.29	2.74	6.12	2.37	0.73	
P91	NW NW NE 23-18N-7W	L	54.86	0.57	7.64	2.18	0.47	5.90	11.08	
MERCER COUNTY										
213	Hydraulic Press Brick Co. pit, Shale City	Sh	47.59	0.62	30.04	4.53	1.66	2.08	0.84	
1348A	Hydraulic Press Brick Co. pit, Shale City	Sh	55.02	-	21.93	5.25	3.98	1.81	0.39	
MONROE COUNTY										
S22	NE NW 10-3S-11W	Sh	56.40	-	7.09	4.46	-	2.38	15.18	
580	NE NE 10-3S-11W	Sh	51.46	0.49	22.75	6.87	1.16	2.86	0.69	
MONTGOMERY COUNTY										
1412	NW SW 30-8N-2W	Sh	57.55	-	21.99	3.75	3.01	1.94	0.52	
L8	2-8N-5W	Sh	71.65	-	12.69	6.32	-	1.60	1.51	
OGLE COUNTY										
NF125	SE NW 6-23N-10E	Sh	34.37	-	8.56	2.30	-	11.53	18.24	
P4	Polo, Ill.	Df	75.81	0.81	12.09	3.25	0.25	0.83	0.63	
P2	Polo, Ill.	Df	75.76	0.69	12.06	2.51	0.35	0.84	0.58	

* Key to symbols:

Sh - shale Cl - clay Al - alluvium L - loess St - silt
Df - drift Unc - underclay Col - colluvium T - till S - soil

† P₂O₅ - 0.44

Continued

Na ₂	K ₂ O	Ign.	Total	SO ₃	CO ₂	H ₂ O ⁺	H ₂ O ⁻	Unit	Age	Reference No.
MASSAC COUNTY										
-	-	6.02	98.71	-	-	-	3.55	McNairy	Cre.	1
-	-	6.81	99.69	-	-	-	1.64	McNairy	Cre.	1
-	-	7.52	99.32	-	-	-	3.44	McNairy	Cre.	1
-	-	5.31	97.68	-	-	-	1.13	McNairy	Cre.	1
-	-	5.27	99.48	-	-	-	1.41	McNairy	Cre.	1
-	-	6.83	98.95	-	-	-	2.58	McNairy	Cre.	1
0.46	0.65	2.62	-	-	0.05	-	-	-	Recent	26
0.10	2.87	22.92	-	-	19.53	-	-	Renault	Miss.	26
McDONOUGH COUNTY										
0.42	3.40	8.18	100.69	-	-	7.77	1.04	Tradewater	Penn.	25
0.53	1.27	11.95	99.96	-	-	-	0.85	Tradewater	Penn.	16
-	-	4.31	99.38	-	-	-	0.33	Tradewater	Penn.	1
-	-	3.03	96.88	-	-	-	0.49	Tradewater	Penn.	1
-	-	4.32	99.41	-	-	-	0.81	Tradewater	Penn.	1
1.35	2.82	5.45	99.77	-	-	4.91	1.04	Francis Cr.	Penn.	25
0.76	3.27	8.50	100.50	2.14	-	-	1.12	Francis Cr.	Penn.	25
MENARD COUNTY										
1.01	3.23	8.02	99.72	-	-	5.44	1.24	Trivoli	Penn.	25
1.41	1.64	14.56	100.31	0.11	13.34	1.21	0.56	Pro-Illinoian	Pleis.	25
MERCER COUNTY										
0.56	3.19	8.81	99.92	-	-	8.34	1.13	Greenbush	Penn.	19
0.70	3.42	7.16	99.66	-	-	-	0.68	Greenbush	Penn.	25
MONROE COUNTY										
-	-	14.36	-	0.00	-	-	-	Maquoketa	Ord.	6
0.45	6.79	6.97	100.49	-	-	6.75	2.21	Maquoketa	Ord.	22
MONTGOMERY COUNTY										
0.91	3.37	7.31	100.35	-	-	-	0.90	McLeansboro	Penn.	25
-	-	5.10	-	-	-	-	-	McLeansboro	Penn.	5
OGLE COUNTY										
-	-	24.92	99.92	-	-	-	0.65	Shakopee	Ord.	6
0.92	2.41	3.55	100.55	0.03	-	3.36	3.21	Wisconsin	Pleis.	25
1.00	2.21	4.41	100.41	0.05	-	4.13	2.42	Wisconsin	Pleis.	25

Table 1. -

Petro- graphic No.	Location	Type*	SiO ₂	TiO ₂	Al ₂ O ₃	Fe ₂ O ₃	FeO	MgO	CaO	
		of Rock								
OGLE COUNTY (continued)										
P7	Polo, Ill.	Df	75.38	0.78	12.29	2.95	0.30	0.94	0.61	
P14	Polo, Ill.	Df	76.41	0.77	11.63	1.98	0.65	0.95	0.91	
P21	Polo, Ill.	Df	54.67	0.60	8.46	1.70	0.67	6.59	9.49	
PEORIA COUNTY										
1402	SE NW 13-11N-6E	Sh	53.46	-	22.90	7.96	1.51	2.38	0.50	
W143C	SW NE NE 8-11N-9E	Cl	65.67	1.08	19.46	1.44	-	0.25	3.11	
W195e	SW NE NE 8-11N-9E	Cl	59.66	1.08	22.35	3.55	-	0.99	1.44	
R216	NW SE NE 26-8N-9E	L	61.70	0.12	9.16	3.10	-	4.46	6.96	
PERRY COUNTY										
272	Duquoin strip mine NE	Sh	57.08	2.15	21.93	2.10	3.78	2.61	0.66	
1323A	NE SW NE 5-4S-4W	Sh	61.41	-	19.05	3.92	2.96	1.87	0.58	
1309A	SW NW 5-6S-1W	Sh	62.23	-	15.48	4.35	2.23	1.54	0.60	
1309B	SW NW 5-6S-1W	Sh	55.54	-	19.74	5.06	4.97	2.44	0.72	
1309C	SW NW 5-6S-1W	Sh	55.02	-	21.42	1.96	5.68	2.48	0.52	
PIKE COUNTY										
R119	SE SE SW 13-7S-3W	Cl	58.63	1.51	18.21	9.07	-	0.89	0.76	
R120	SE SE SW 13-7S-3W	Cl	48.42	1.58	18.92	18.95	-	1.03	0.67	
La1	NW NW 25-7S-4W	Cl	49.55	1.91	26.95	6.99	-	0.90	0.56	
La2	NW NW 25-7S-4W	Cl	54.90	1.73	26.24	3.87	-	0.94	0.41	
DS51	SE NW 24-4S-7W	Sh	50.97	0.57	23.97	4.24	1.70	1.20	4.23	
DS45	SW SW 36-6S-5W	Sh	51.28	0.53	22.91	4.04	1.69	4.29	1.71	
996N	NW SW NW 10-4S-5W	Cl**	53.11	1.98	32.39	0.36	0.09	0.30	0.13	
POPE COUNTY										
NF264	SE SW NE 24-13S-6E	L	75.50	-	12.16	4.38	-	0.93	0.74	
NF510	Cen. E $\frac{1}{2}$ 13-12S-5E	Sh	65.26	0.86	18.21	4.97	0.41	1.06	0.35	
D34	27-14S-5E	Cl	63.20	1.04	22.60	2.50	-	-	-	
D35	27-14S-5E	Cl	61.20	1.36	24.11	1.89	-	-	-	
D56	Raum	Cl	58.06	0.14	26.57	1.23	-	-	-	
Bu21	26-13S-6E	Sh	60.75	-	20.49	7.30	-	1.73	0.52	
Bu22	26-13S-6E	Sh	59.97	-	21.00	7.15	-	1.58	0.60	
Bu23	26-13S-6E	Sh	59.90	-	20.27	6.80	-	1.66	1.14	
577A	Cen. S $\frac{1}{2}$ 19-12S-5E	Sh	51.92	0.58	23.63	2.49	2.39	3.96	2.19	
PULASKI COUNTY										
NF571A	SW SE SE 26-14S-2E	Al	52.39	-	14.87	5.16	-	3.92	8.02	
NF571B	SW SE SE 26-14S-2E	Al	67.07	-	17.12	5.19	-	0.31	0.97	
NF571C	SW SE SE 26-14S-2E	Al	58.95	-	16.86	5.44	-	2.75	4.43	

* Key to symbols:

Sh - shale Cl - clay Al - alluvium L - loess St - silt
 Df - drift Unc - underclay Col - colluvium T - till S - soil

** P₂O₅ - trace

Continued

Na ₂ O	K ₂ O	Ign.	Total	SO ₃	CO ₂	H ₂ O+	H ₂ O-	Unit	Age	Reference No.
OGLE COUNTY (continued)										
0.99	2.61	3.42	100.27	0.02	-	3.31	2.96	Wisconsin	Pleis.	25
1.38	3.01	2.54	100.23	0.03	-	2.40	1.53	Wisconsin	Pleis.	25
1.37	2.13	14.76	100.44	0.03	-	1.64	0.73	Wisconsin	Pleis.	25
PEORIA COUNTY										
0.67	4.34	6.33	100.05	-	-	-	3.29	McLeansboro	Penn.	25
0.15	1.82	7.76	100.75	0.01	1.21	-	0.29	McLeansboro	Penn.	25
0.11	2.06	9.05	100.47	0.18	2.52	-	0.30	McLeansboro	Penn.	25
1.13	2.18	11.46	100.33	0.04	8.62	-	0.80	Peorian	Pleis.	6
PERRY COUNTY										
0.76	2.72	6.21	100.00	-	-	5.71	1.19	Carbondale	Penn.	22
1.34	2.88	5.74	99.75	-	-	5.04	0.97	Carbondale	Penn.	25
1.40	2.24	9.04	99.11	-	-	5.43	1.60	Carbondale	Penn.	25
1.16	2.97	6.80	99.40	-	-	5.28	0.40	Carbondale	Penn.	25
1.28	3.47	7.35	99.18	-	-	5.74	0.77	Carbondale	Penn.	25
PIKE COUNTY										
0.31	1.91	8.79	100.08	0.00	0.17	-	1.66	Tradewater	Penn.	25
0.07	2.25	8.85	100.74	0.00	0.02	-	2.19	Tradewater	Penn.	25
0.14	2.22	10.85	100.07	0.00	0.07	-	1.26	Tradewater	Penn.	25
0.00	1.58	10.90	100.57	t	0.16	-	1.73	Tradewater	Penn.	25
0.08	6.92	6.44	100.32	-	-	6.24	2.26	Hannibal	Miss.	22
0.27	6.85	7.08	100.65	-	-	6.81	2.22	Hannibal	Miss.	25
0.28	0.29	11.49	100.42	0.00	-	-	0.84	Tradewater	Penn.	25
POPE COUNTY										
1.12	2.10	3.20	-	-	0.09	-	-	Wisconsin	Pleis.	26
0.13	3.32	5.58	-	0.05	0.00	-	-	-	Penn.	26
-	-	7.04	99.74	-	-	-	3.36	McNairy	Cre.	1
-	-	7.20	99.64	-	-	-	3.88	McNairy	Cre.	1
-	-	9.84	100.46	-	-	-	4.62	?	-	1
-	-	6.05	-	-	-	-	-	Chester?	Miss.	3
-	-	5.54	-	-	-	-	-	Chester?	Miss.	3
-	-	6.70	-	-	-	-	-	Chester?	Miss.	3
0.19	4.57	7.99	99.91	-	-	7.06	4.74	Kinkaid	Miss.	22
PULASKI COUNTY										
0.43	2.99	12.23	-	-	8.43	-	-	-	Recent	26
0.62	2.61	5.41	-	-	0.12	-	-	-	Recent	26
0.52	2.95	8.67	-	-	4.17	-	-	-	Recent	26

Table 1. -

Petro- graphic No.	Location	Type*		SiO ₂	TiO ₂	Al ₂ O ₃	Fe ₂ O ₃	FeO	MgO	CaO
		Rock	of							
PULASKI COUNTY (continued)										
NF496	SW SW SW 7-16S-1W	L		69.25	-	10.16	3.06	-	2.67	4.32
FE101	Olmsted Standard Oil	pit	Cl**	59.97	0.48	16.44	4.45	0.17	2.09	0.50
FE103	Olmsted Standard Oil	pit	Cl†	61.32	0.37	15.88	4.51	0.17	2.31	0.56
FE108	Olmsted Standard Oil	pit	Cl††	64.24	t	14.60	4.59	0.15	1.95	1.26
FE113	NE SE 27-15S-1E		Cl ^a	59.16	0.49	16.67	3.79	0.21	1.56	1.00
FE116	NE SE 27-15S-1E		Cl ^b	61.06	0.21	15.99	4.50	0.12	2.00	0.86
FE117	NE SE 27-15S-1E		Cl ^c	65.22	0.24	13.86	2.82	2.06	1.76	0.89
FE122	NE SE 27-15S-1E		Cl ^d	61.67	0.46	15.85	3.40	0.77	2.07	0.58
La3	SW NW NW 26-15S-1E		Cl	69.07	0.84	11.87	4.36	-	1.79	0.85
B4	Cent. S. line SW SW 27- 14S-2E		Cl	59.60	0.72	26.48	2.39	-	0.77	0.44
D45	15-15S-1W		Cl	62.76	0.97	22.36	3.07	-	-	-
D36	18-15S-2E		Cl	68.26	1.14	20.87	2.03	-	-	-
D33	1-15S-2E		Cl	67.54	0.78	21.54	1.70	-	-	-
D44	31-15S-1W		Sh	69.92	0.98	20.19	1.21	-	-	-
D46	15-15S-1W		Cl	57.14	1.08	25.52	2.82	-	-	-
RANDOLPH COUNTY										
1418	NW NE 32-7S-6W		Sh	60.24	-	20.14	3.63	2.25	2.87	0.83
1338A	NW SW SE 5-7S-5W		Sh	59.69	-	23.29	4.87	0.63	1.02	0.34
1338B	NE NW SW 6-7S-5W		Sh	64.17	-	20.76	3.08	1.09	1.20	0.39
1308A	NE NW 36-4S-5W		Sh	56.86	-	21.75	1.85	4.27	1.94	0.61
1308B	NE NW 36-4S-5W		Sh	57.43	-	22.68	3.63	2.82	1.51	0.40
1308C	NE NW 36-4S-5W		Sh	66.19	-	18.79	1.14	2.64	1.47	0.70
1308D	NE NW 36-4S-5W		Sh	60.09	-	23.07	0.81	1.83	1.37	0.20
1308E	NE NW 36-4S-5W		Sh	54.69	-	19.19	3.49	5.67	2.16	1.59
1308F	NE NW 36-4S-5W		Sh	61.99	-	18.23	1.48	5.19	1.69	0.47
Wa	NW 15-7S-7W		Sh	57.55	-	23.51	6.05	-	3.39	2.13
Wb	NW 15-7S-7W		Sh	63.22	-	16.98	5.69	-	3.16	2.30
S3	NW NE 23-7S-7W		Sh	55.32	-	17.84	8.24	-	3.61	3.76
S14	NE NW 15-7S-7W		Sh	63.44	-	18.30	6.39	-	2.29	1.52
S4	NW NE 23-7S-7W		Df	72.13	-	12.02	4.05	-	1.22	1.85
L9	20-5S-9W		Df	75.93	-	11.96	3.48	-	2.04	2.01
RICHLAND COUNTY										
1413	NE NE NE 14-2N-10E		Sh	64.99	-	19.67	3.49	1.26	1.84	0.39

* Key to symbols:

Sh - shale	Cl - clay	Al - alluvium	L - loess	St - silt
Df - drift	Unc - underclay	Col - colluvium	T - till	S - soil
** P ₂ O ₅ 0.35				
† P ₂ O ₅ 0.47				
†† P ₂ O ₅ 0.28				
a - P ₂ O ₅ 0.28				
b - P ₂ O ₅ 0.36				
c - P ₂ O ₅ 0.53				
d - P ₂ O ₅ 0.39				

Continued

Na ₂ O	K ₂ O	Ign.	Total	SO ₃	CO ₂	H ₂ O ⁺	H ₂ O ⁻	Unit	Age	Reference No.
PULASKI COUNTY (continued)										
1.33	2.12	6.98	-	-	4.94	-	-	-	Pleis.	26
0.16	1.21	14.15	99.97	-	-	14.15	6.72	Porters Cr.	Paleocene	13
0.17	0.95	13.84	100.55	-	-	13.84	5.43	Porters Cr.	Paleocene	13
0.20	1.22	11.73	100.22	-	-	11.73	5.48	Porters Cr.	Paleocene	13
t	1.50	15.23	99.91	-	-	15.25	6.78	Porters Cr.	Paleocene	13
0.07	1.43	13.36	99.96	-	-	13.36	5.88	Porters Cr.	Paleocene	13
0.30	1.03	11.32	100.03	-	-	11.32	5.67	Porters Cr.	Paleocene	13
0.06	1.40	13.12	99.97	-	-	13.12	4.88	Porters Cr.	Paleocene	13
0.00	1.40	10.21	100.39	0.00	0.03	-	4.52	Porters Cr.	Paleocene	6
0.37	1.67	8.03	100.47	-	-	-	-	McNairy	Cre.	20
-	-	6.12	98.27	-	-	-	2.99	Wilcox	Eocene	1
-	-	5.56	99.76	-	-	-	1.90	McNairy	Cre.	1
-	-	6.29	100.33	-	-	-	2.48	McNairy	Cre.	1
-	-	6.35	99.76	-	-	-	1.11	-	Dev.	1
-	-	8.12	98.16	-	-	-	3.48	-	Cre.	1
RANDOLPH COUNTY										
0.22	4.26	4.90	99.34	-	-	-	3.74	Chester	Miss.	25
0.25	3.98	5.98	100.05	-	-	5.81	1.05	Tradewater	Penn.	25
0.23	3.04	6.02	99.98	-	-	5.68	1.12	Tradewater	Penn.	25
0.95	3.03	8.04	99.30	-	-	6.36	0.85	McLeansboro	Penn.	25
1.13	3.41	6.84	99.85	-	-	5.95	0.91	McLeansboro	Penn.	25
1.25	3.02	4.62	99.82	-	-	4.51	0.37	McLeansboro	Penn.	25
0.89	2.71	8.65	99.62	-	-	6.81	2.16	McLeansboro	Penn.	25
0.62	2.46	9.52	99.39	-	-	5.09	0.67	McLeansboro	Penn.	25
0.88	2.39	6.98	99.30	-	-	4.87	0.37	McLeansboro	Penn.	25
-	-	5.83	-	-	-	-	-	Chester	Miss.	5
-	-	7.50	-	-	-	-	-	Chester	Miss.	5
-	-	8.81	-	1.88	-	-	-	Chester	Miss.	6
-	-	5.94	-	0.65	-	-	-	Chester	Miss.	6
-	-	6.05	-	0.19	-	-	-	-	Pleis.	6
-	-	3.20	-	-	-	-	-	-	Pleis.	6
RICHLAND COUNTY										
1.18	3.14	4.43	100.39	-	-	-	0.77	McLeansboro	Penn.	25

Table 1. -

Petro- graphic No.	Location	Type* of Rock	SiO ₂	TiO ₂	Al ₂ O ₃	Fe ₂ O ₃	FeO	MgO	CaO
		ROCK	ISLAND COUNTY						
1354A	SW SW SE 6-17N-5W	Sh	61.07	-	17.67	5.33	1.35	1.26	0.61
H9	NE SE 5-18N-1E	Cl	91.18	0.80	6.05	0.55	-	-	-
H10	NE SE 5-18N-1E	Cl	76.10	1.31	15.31	1.10	-	-	-
L2	Milan	Al	77.31	-	9.20	5.11	-	1.86	2.31
H8	NE SE 5-18N-1E	Cl	61.46	1.60	24.05	2.19	-	-	-
H23	NE SE 5-18N-1E	Cl	55.37	-	21.40	6.72	-	0.65	1.76
ST. CLAIR COUNTY									
1334A	Hydraulic Press Brick Co. pit	Sh	65.01	-	17.07	2.15	3.38	1.89	0.70
1333A	Hill Brick Co. pit	Sh	66.31	-	16.86	0.92	4.18	1.89	0.53
1329B	Cen. SW SW 21-1S-7W	Sh	55.77	-	22.98	3.53	3.19	2.74	0.78
1329A	SW NW NW 21-2S-8W	Sh	56.36	-	19.97	5.46	4.38	2.23	0.44
SALINE COUNTY									
579B	SE SW 32-10S-7E	Sh	51.44	0.55	28.47	1.23	1.43	1.59	1.35
1327A	Harrisburg B & T Co.	Sh	48.38	-	20.84	5.40	7.35	2.08	0.81
SANGAMON COUNTY									
K4	SW SW 1-15N-5W	Sh	60.31	0.84	17.74	5.04	1.96	1.96	0.41
1332A	Poston Brick Co. pit	Sh	59.64	-	19.77	1.31	5.09	1.95	0.56
1330B	Springfield Clay Products pit	Sh	55.78	-	20.28	4.72	5.32	2.03	0.50
243	Poston Brick Co. pit	Sh	46.68	1.35	27.74	7.37	1.18	2.35	0.86
SCHUYLER COUNTY									
L7a	SW 8-1N-1E	Sh	73.78	-	16.20	1.76	-	2.09	0.63
R210	NW SW SW 8-1N-1E	Cl	66.30	1.18	18.77	4.30	-	0.44	0.36
256	SE SW SW 8-1N-1E	Cl	59.85	1.62	25.04	2.01	-	0.51	0.49
L7b	SW 8-1N-1E	Sh	73.66	-	16.37	2.06	-	2.10	0.63
978NNN	31-2N-1E	Sh	48.12	1.37	26.73	1.50	4.22	2.68	0.58
978UUU	31-2N-1E	Sh	43.12	1.53	23.09	9.80	0.77	1.69	0.80
1410	SE SW SW 27-2N-2W	Sh	57.44	-	21.73	7.13	2.37	2.06	0.28
SCOTT COUNTY									
284	NE 21-13N-12W	Cl	53.32	1.56	31.09	1.57	0.00	0.69	0.83
R129	SE SE SW 23-15N-13W	Cl	59.15	2.07	23.33	1.92	-	0.65	0.76
SHELBY COUNTY									
1422	NW cor. 24-11N-3E	Sh	62.40	-	20.35	5.49	0.91	1.68	0.56

* Key to symbols:

Sh - shale Cl - clay Al - alluvium L - loess St - silt
Df - drift Unc - underclay Col - colluvium T - till S - soil

Continued

Na ₂ O	K ₂ O	Ign.	Total	SO ₃	CO ₂	H ₂ O ⁺	H ₂ O ⁻	Unit	Age	Reference No.
ROCK ISLAND COUNTY										
0.19	3.98	9.08	100.54	-	-	-	2.29	Tradewater	Penn.	25
-	-	1.68	100.42	-	-	-	0.16	Tradewater	Penn.	1
-	-	4.63	99.05	-	-	-	0.60	Tradewater	Penn.	1
-	-	3.30	-	-	-	-	-	-	Recent	5
-	-	6.66	97.77	-	-	-	1.81	Tradewater	Penn.	1
(Alk 2.42)		8.75	-	-	-	-	3.39	Tradewater	Penn.	3
ST. CLAIR COUNTY										
1.33	2.59	5.69	99.81	-	-	-	0.64	McLeansboro	Penn.	25
1.49	2.34	5.39	99.91	-	-	4.31	0.30	McLeansboro	Penn.	25
1.22	3.70	5.96	99.87	-	-	5.84	1.43	McLeansboro	Penn.	25
1.21	2.82	6.47	99.34	-	-	5.52	0.58	McLeansboro	Penn.	25
SALINE COUNTY										
0.38	5.30	8.41	100.15	-	-	8.14	1.96	Clore	Miss.	22
0.70	3.32	10.48	99.36	-	-	-	0.59	Carbondale	Penn.	25
SANGAMON COUNTY										
1.07	2.88	6.71	-	0.14	-	-	0.81	McLeansboro	Penn.	3
1.17	2.79	7.26	99.54	-	-	5.40	0.76	McLeansboro	Penn.	25
1.17	2.81	7.30	99.91	-	-	-	0.46	McLeansboro	Penn.	25
0.20	3.75	8.45	99.93	-	-	8.52	1.89	McLeansboro	Penn.	19
SCHUYLER COUNTY										
-	-	4.63	-	-	-	-	-	Francis Cr.	Penn.	5
0.09	1.82	7.41	100.67	tr	1.20	-	0.29	Tradewater	Penn.	25
0.24	2.84	7.90	100.50	-	-	7.82	1.30	Tradewater	Penn.	22
-	-	4.85	-	-	-	-	-	Tradewater	Penn.	5
0.73	5.33	8.69	99.95	-	-	7.64	1.41	Liverpool	Penn.	22
0.73	5.31	12.71	99.55	-	-	8.00	2.07	Tradewater	Penn.	22
1.28	3.33	5.38	101.00	-	-	-	0.79	Carbondale	Penn.	25
SCOTT COUNTY										
0.26	0.59	10.36	100.27	-	-	10.19	4.30	Tradewater	Penn.	16
0.39	1.24	10.80	100.31	tr	0.02	-	1.76	Tradewater	Penn.	25
SHELBY COUNTY										
0.64	2.59	5.16	99.78	-	-	5.08	1.58	McLeansboro	Penn.	25

Table 1. -

Petro- graphic No.	Location	Type* of Rock		SiO ₂	TiO ₂	Al ₂ O ₃	Fe ₂ O ₃	FeO	MgO	CaO
STARK COUNTY										
1398	NE NW 25-13N-6E	Sh		56.95	-	22.25	5.49	1.97	1.60	0.35
STEPHENSON COUNTY										
DS76	SE 1-26N-6E	Sh		44.97	-	16.23	5.46	-	5.38	9.74
TAZEWELL COUNTY										
R220	NW NW NE 5-25N-4W	Sh		60.76	1.86	17.54	6.73	-	2.23	0.58
224	NW NW NE 5-25N-4W	Sh		49.27	1.69	27.87	2.32	3.22	2.49	0.69
H16	NE 6-25N-4W	Sh		60.93	-	17.93	8.12	-	0.91	1.33
1322B	Peoria Brick & Tile Co. pit	Sh		59.80	-	19.13	4.81	4.13	2.01	0.39
UNION COUNTY										
D10	SE SW 35-11S-2W	Cl		43.90	2.40	40.79	1.76	-	-	-
D11	SE SW 35-11S-2W	Cl		48.30	3.20	31.14	1.02	-	-	-
D12	SE SW 35-11S-2W	Cl		56.55	2.75	29.97	1.23	-	-	-
D13	SE SW 35-11S-2W	Cl		47.95	3.01	37.86	1.23	-	-	-
D14	SE SW 35-11S-2W	Cl		52.65	2.92	33.98	0.97	-	-	-
502	SE NW 2-12S-2W	Cl		52.40	1.21	31.91	1.21	0.00	0.45	1.24
503	NW SW 35-11S-2W	Cl		44.59	2.17	36.83	1.14	0.00	0.39	1.02
504	NE SW 35-11S-2W	Cl		53.62	1.23	29.84	1.75	0.10	0.66	1.23
506	NE SW 35-11S-2W	Cl		50.51	1.40	31.76	2.01	0.14	0.70	1.40
501	NW NE 3-12S-2W	Cl		43.24	2.50	37.44	1.94	0.00	0.10	0.94
B15	Kaolin	Cl		48.52	1.21	30.94	1.60	0.40	0.85	1.03
L500	NW NW SE 34-13S-2W	Sh		65.88	-	23.86	0.65	-	0.53	0.73
546	NW SE 14-12S-2W	Sh		64.22	0.29	15.03	3.06	1.38	2.42	3.06
547	NW SE 14-12S-2W	Sh		46.12	0.45	18.51	3.11	3.15	3.07	1.04
1425	NW SE 14-12S-2W	Sh		55.71	-	18.98	2.45	2.67	1.93	0.11
1335A	NW SE NE 11-13S-2W	Sh		74.93	-	12.75	4.38	0.19	1.32	0.17
L16	NE SW 9-12S-1W	Sh		46.54	-	17.85	0.43	-	-	-
L11	6-12S-1W	Sh		64.78	-	18.17	6.74	-	1.69	1.43
W266	NE SE 1-13S-2W	Sh		71.24	(R ₂ O ₃)	13.74)	-	-	1.50	5.32
L10	NW NE 20-12S-1W	L		73.10	2	13.45	5.33	-	2.18	2.12
NF569	SW SE SW 32-12S-2W	Al		79.23	-	10.63	2.74	-	0.59	0.78
NF515S	S ₂ NE SE 25-11S-2W	Sh		28.94	-	6.67	1.55	-	1.28	32.87
NF535S	NE NW SE 2-13S-1E	Sh		27.83	-	9.83	2.95	-	1.49	30.10
NF517	SE NE NE 34-11S-2W	Sh		62.71	0.74	13.16	4.44	-	1.39	0.18
1	NW NE 23-12S-2W	Sh		56.88	0.75	13.88	5.72	-	1.83	0.70
NF514A1	W ₂ NE NE 23-12S-2W	Sh		81.47	-	10.00	2.78	-	1.05	0.19
NF514A2	W ₂ NE NE 23-12S-2W	Sh		74.71	-	11.97	3.36	-	1.46	1.34
NF541	SE SW NE 26-13S-2W	Sh		73.38	0.59	12.93	2.64	1.16	1.78	0.40
AK	NE SW NW 35-11S-2W	Cl		51.10	0.95	34.01	1.41	-	0.37	0.15
10	SW 11-12S-2W	Sh		53.7	-	16.3	5.7	-	1.6	0.8
11	SW 11-12S-2W	Sh		56.4	-	15.2	5.6	-	1.1	0.2
LM14	NW NW NE 26-13S-2W	Sh		78.63	0.60	11.36	2.33	-	0.79	0.10
NF413	SE SW NE 26-13S-2W	Sh		77.88	0.66	12.85	1.61	-	0.97	0.33

* Key to symbols:

Sh - shale Cl - clay Al - alluvium L - loess St - silt
Df - drift Unc - underclay Col - colluvium T - till S - soil

Continued

Na ₂ O	K ₂ O	Ign.	Total	SO ₃	CO ₂	H ₂ O ⁺	H ₂ O ⁻	Unit	Age	Reference No.
STARK COUNTY										
0.25	3.96	6.75	99.57	-	-	-	1.40	Brereton?	Penn.	25
STEPHENSON COUNTY										
-	-	18.00	99.78	-	12.42	-	0.86	Maquoketa	Ord.	6
TAZEWELL COUNTY										
1.18	3.40	5.51	99.82	0.03	0.62	-	0.48	Carbondale	Penn.	25
0.58	4.37	7.84	100.34	-	-	7.83	0.65	Carbondale	Penn.	22
(Alk 5.01)		5.73	-	-	-	-	0.55	Carbondale	Penn.	3
1.05	2.81	5.76	99.89	-	-	-	0.23	Carbondale	Penn.	25
UNION COUNTY										
-	-	9.90	100.00	-	-	-	1.25	Wilcox	Eocene	1
-	-	15.37	100.00	-	-	-	0.97	Wilcox	Eocene	1
-	-	8.64	100.00	-	-	-	0.86	Wilcox	Eocene	1
-	-	9.05	100.00	-	-	-	0.90	Wilcox	Eocene	1
-	-	10.61	100.00	-	-	-	0.87	Wilcox	Eocene	1
0.09	0.13	11.98	100.62	-	-	11.57	0.96	Wilcox	Eocene	23
0.13	0.32	13.63	100.22	-	-	13.44	0.59	Wilcox	Eocene	23
0.07	0.35	11.60	100.45	-	-	11.59	1.38	Wilcox	Eocene	23
0.27	0.29	11.90	100.38	-	-	11.57	1.76	Wilcox	Eocene	23
0.12	0.09	14.06	100.43	-	-	13.73	0.27	Wilcox	Eocene	23
0.01	0.29	-	99.97	-	-	14.11	0.74	Wilcox	Eocene	25
0.32	1.02	7.48	100.47	-	0.09	-	0.87	Clear Cr.	Dev.	21
0.47	4.33	6.40	100.66	-	-	5.08	1.05	Hannibal	Miss.	22
0.74	6.30	17.53	100.42	-	-	11.57	0.99	New Albany	Dev.	22
0.43	5.69	12.34	100.31	-	-	-	0.68	New Albany	Dev.	25
0.16	2.63	3.75	100.28	-	-	3.63	1.00	-	-	25
-	-	-	-	-	-	-	-	Renault	Miss.	6
-	-	5.62	-	-	-	-	-	-	Miss.	5
-	-	7.66	-	-	-	-	-	-	Miss.	5
-	-	2.68	-	-	-	-	-	-	Pleis.	5
0.91	1.76	2.95	-	-	0.06	-	-	-	Recent	26
0.08	1.21	27.93	-	-	25.84	-	-	Golconda	Miss.	26
0.12	1.41	26.61	-	-	23.61	-	-	Golconda	Miss.	26
0.15	4.39	12.32	-	0.84	0.00	-	-	New Albany	Dev.-Miss.	26
0.57	4.19	15.90	-	-	-	-	-	New Albany	Dev.-Miss.	26
0.15	2.38	2.69	-	-	0.00	-	-	Springville	Miss.	26
0.16	3.37	4.10	-	-	1.03	-	-	Springville	Miss.	26
0.19	3.68	3.56	-	0.07	0.11	-	-	Springville	Miss.	26
0.36	0.31	11.95	-	-	-	-	-	-	Cre.	21
0.5	5.0	12.7	-	-	-	-	-	New Albany	Dev.-Miss.	26
0.6	4.3	14.5	-	-	-	-	-	New Albany	Dev.-Miss.	26
0.11	2.88	3.38	-	-	0.04	-	-	Springville	Miss.	21
0.17	2.60	3.44	-	-	-	-	-	Springville	Miss.	21

Table 1. -

Petro- graphic No.	Location	Type of Rock	SiO ₂	TiO ₂	Al ₂ O ₃	Fe ₂ O ₃	FeO	MgO	CaO
VERMILION COUNTY									
410	W $\frac{1}{2}$ 31-19N-13W	Cl	52.90	0.76	26.06	2.02	2.92	1.66	1.14
411	W $\frac{1}{2}$ 31-19N-13W	Cl	51.94	0.76	26.41	2.09	2.90	2.20	1.21
412	W $\frac{1}{2}$ 31-19N-13W	Cl	52.90	0.72	26.61	1.51	2.61	1.92	1.43
413	W $\frac{1}{2}$ 31-19N-13W	Cl	53.30	0.70	26.76	1.30	2.62	2.18	1.38
414	W $\frac{1}{2}$ 31-19N-13W	Cl	52.83	0.72	25.91	1.55	2.82	2.05	1.46
F1	NE SE 7-19N-11W	Sh	58.52	0.96	15.67	4.99	3.37	1.45	1.05
K14	SW 12-19N-12W	Sh	64.09	0.89	14.16	2.65	3.16	1.64	1.69
285	Western Brick Co. pit	Sh	50.90	1.61	25.80	2.39	2.76	2.63	0.63
1342A	Western Brick Co. pit	Sh	55.26	-	21.57	4.74	4.60	2.29	0.53
1343A	Strip pit W. of Danville	Sh	52.60	-	22.48	1.28	5.61	2.67	0.69
1343B	Strip pit W. of Danville	Sh	55.54	-	19.25	4.02	6.04	2.34	0.52
1088	12-17N-11W	Sh	48.19	1.15	28.05	0.69	4.44	2.71	0.48
WABASH COUNTY									
L16	36-1S-13W	Sh	55.95	-	18.89	8.09	-	3.06	2.31
WARREN COUNTY									
H41	Western Stone Co.	Cl	66.50	1.28	21.50	1.56	-	-	-
H42	Western Stone Co.	Cl	65.14	1.60	21.53	1.59	-	-	-
H43	Western Stone Co.	Cl	55.96	1.60	29.47	1.57	-	-	-
977Z	24-8N-1W	Sh	47.33	1.25	29.72	1.83	3.56	2.43	0.28
977DD	13-8N-1W	Sh	46.79	1.85	33.52	2.48	0.51	0.78	0.19
WASHINGTON COUNTY									
1339A	SE SW SW 18-2S-4W	Sh	53.19	-	23.73	10.57	0.32	1.81	0.49
WHITE COUNTY									
1409	NW SW SW 11-5S-9E	Sh	49.28	-	21.46	4.90	6.44	2.04	0.45
4-69	NE NE NW 18-7S-10E	Cl	51.14	1.12	27.12	2.79	1.44	2.37	0.40
4-115	NE NE NW 18-7S-10E	Sh	47.18	1.06	28.52	2.51	2.84	2.06	0.58
4-148	NE NE NW 18-7S-10E	Cl	46.58	1.02	34.53	0.69	1.27	0.75	0.24
4-244	NE NE NW 18-7S-10E	Sh	46.87	1.00	28.46	2.05	3.80	2.19	0.55
4-250	NE NE NW 18-7S-10E	Sh	46.95	0.92	27.36	1.31	4.57	2.07	0.66
WHITESIDE COUNTY									
H18	Sterling	Sh	39.91	-	16.43	4.80	-	5.08	7.57
WILLIAMSON COUNTY									
422	SE 25-9S-4E	Cl	56.68	1.37	23.19	1.91	1.71	1.90	1.48
423	SE 25-9S-4E	Cl	58.30	1.49	21.91	1.94	1.75	2.02	1.93
424	SE 25-9S-4E	Cl	55.98	1.46	22.83	2.35	1.68	2.39	2.15
426	SE 25-9S-4E	Cl	51.66	1.25	21.56	2.52	1.95	2.39	5.55
1419	S $\frac{1}{2}$ N $\frac{1}{2}$ 21-9S-4E	Sh	49.71	-	21.10	1.73	8.65	2.31	1.03
1429	SE SE 25-10S-3E	Sh	60.67	-	24.58	2.67	0.56	1.07	0.05

* Key to symbols:

Sh - shale Cl - clay Al - alluvium L - loess St - silt
 Df - drift Unc - underclay Col - colluvium T - till S - soil

Continued

Na ₂ O	K ₂ O	Ign.	Total	SO ₃	CO ₂	H ₂ O ⁺	H ₂ O ⁻	Unit	Age	Reference No.
VERMILION COUNTY										
0.45	5.23	7.35	100.49	-	0.02	6.22	2.73	McLeansboro	Penn.	16
0.42	4.86	7.20	99.99	-	0.11	6.69	3.19	McLeansboro	Penn.	16
0.33	4.87	7.34	100.24	-	0.44	6.69	3.42	McLeansboro	Penn.	16
0.43	4.12	7.45	100.24	-	0.08	6.44	3.45	McLeansboro	Penn.	16
0.64	4.90	7.43	100.31	-	0.49	6.54	2.49	McLeansboro	Penn.	16
1.48	2.94	7.72	-	0.32	-	-	2.02	McLeansboro	Penn.	3
0.77	2.90	6.47	-	0.24	-	-	0.51	McLeansboro	Penn.	3
0.84	4.64	7.29	100.49	-	-	7.17	0.69	Sparland	Penn.	19
1.21	3.43	6.37	100.00	-	-	-	0.63	Sparland	Penn.	25
1.03	4.30	8.97	99.63	-	-	-	1.16	Sparland	Penn.	25
1.28	3.02	7.38	99.39	-	-	-	0.50	Sparland	Penn.	25
0.75	5.61	7.72	99.79	-	-	7.37	1.74	Brereton	Penn.	22
WABASH COUNTY										
-	-	8.74	-	-	-	-	-	McLeansboro	Penn.	6
WARREN COUNTY										
-	-	7.05	99.14	-	-	-	1.25	Tradewater	Penn.	1
-	-	7.37	-	-	-	-	1.62	Tradewater	Penn.	1
-	-	8.25	98.26	-	-	-	1.41	Tradewater	Penn.	1
0.56	4.88	8.15	99.99	-	-	8.13	1.46	Tradewater	Penn.	22
0.54	2.40	11.39	100.45	-	-	10.84	1.37	Tradewater	Penn.	22
WASHINGTON COUNTY										
0.62	3.18	6.88	100.79	-	-	6.63	2.61	McLeansboro	Penn.	25
WHITE COUNTY										
0.80	3.25	11.31	99.93	-	-	-	0.54	McLeansboro	Penn.	25
1.53	5.53	6.69	100.13	-	-	-	-	Carbondale	Penn.	22
1.04	4.73	9.62	100.14	-	-	8.19	1.21	Tradewater	Penn.	22
0.96	2.46	11.88	100.38	-	-	-	-	Tradewater	Penn.	25
1.19	4.42	9.45	99.98	-	-	8.39	1.30	Caseyville	Penn.	22
0.46	3.88	11.52	99.70	-	-	8.97	1.59	Caseyville	Penn.	22
WHITESIDE COUNTY										
(Alk 3.71)		21.02	-	-	-	-	0.86	Maquoketa	Ord.	3
WILLIAMSON COUNTY										
0.45	4.47	6.83	99.99	-	0.08	6.54	3.11	Brereton	Penn.	16
0.49	4.15	6.53	100.51	-	0.06	5.86	4.19	Brereton	Penn.	16
0.42	4.71	6.49	100.46	-	0.09	5.98	2.36	Brereton	Penn.	16
0.67	4.12	8.45	100.12	-	2.88	5.33	3.37	Brereton	Penn.	16
0.60	3.27	11.51	99.91	-	-	-	0.64	Brereton	Penn.	25
0.37	4.37	5.99	100.33	-	-	-	1.05	Tradewater	Penn.	25

Table 1. -

Petro- graphic No.	Location	Type of Rock	SiO ₂	TiO ₂	Al ₂ O ₃	Fe ₂ O ₃	FeO	MgO	CaO
WILLIAMSON COUNTY (continued)									
1105-57	NE cor. NE 12-8S-3E	Sh	49.16	1.11	29.32	1.43	1.84	1.68	0.27
1105-59	NE cor. NE 12-8S-3E	Sh	49.33	1.36	28.55	1.54	2.51	1.84	0.26
1105-60	NE cor. NE 12-8S-3E	Sh	48.82	1.33	28.79	2.05	1.78	1.74	0.39
1105-61	NE cor. NE 12-8S-3E	Sh	49.62	1.36	27.87	1.77	2.14	1.97	0.60
1105-62	NE cor. NE 12-8S-3E	Sh	49.13	1.49	29.17	1.37	1.78	1.77	0.21
1105-63	NE cor. NE 12-8S-3E	Sh	48.78	1.36	28.21	2.37	2.25	2.12	0.36
1105-64	NE cor. NE 12-8S-3E	Sh	47.39	1.37	27.54	2.78	2.57	1.99	1.14
1105-65	NE cor. NE 12-8S-3E	Sh	46.95	1.38	26.60	1.98	4.15	2.27	1.30

* Key to symbols:

Sh - shale	Cl - clay	Al - alluvium	L - loess	St - silt
Df - drift	Unc - underclay	Col - colluvium	T - till	S - soil

Continued

Na ₂ O	K ₂ O	Ign.	Total	SO ₃	CO ₂	H ₂ O ⁺	H ₂ O ⁻	Unit	Age	Reference No.
WILLIAMSON COUNTY (continued)										
1.11	5.87	8.21	100.0	-	-	7.56	1.40	Tradewater	Penn.	22
0.87	5.77	7.88	99.91	-	-	7.28	1.76	Caseyville	Penn.	22
0.99	6.11	7.86	99.86	-	-	6.92	1.49	Caseyville	Penn.	22
0.99	5.96	7.97	100.25	-	-	7.08	1.94	Caseyville	Penn.	22
1.16	6.28	7.58	99.94	-	-	6.74	2.31	Caseyville	Penn.	22
0.80	6.08	7.69	100.02	-	-	7.04	1.22	Caseyville	Penn.	22
0.83	5.51	8.64	99.76	-	-	6.94	1.26	Caseyville	Penn.	22
0.84	5.33	8.87	99.67	-	-	7.14	2.07	Caseyville	Penn.	22

Table 2. - Spectrochemical Analyses

Pit No.	Location	County	B	Co	Cr	(In parts per	
						Cu	Ga
1423	NW NW 21-15S-3W	Alexander	90	15	70	30	25
1424	SE SE 28-15S-3W	Alexander	110	15	50	70	25
1415	NE NW 13-6N-5W	Bond	90	20	90	100	35
1337A	SE SE NW 24-1S-4W	Brown	80	30	110	120	30
1337B	SE SE NW 24-1S-4W	Brown	90	25	85	80	30
1404	NW SW NE 24-16N-6E	Bureau	80	15	50	80	30
1349A	NE NE NE 11-9S-3W	Calhoun	130	25	80	80	20
1352A	SW NE SW 17-11S-2W	Calhoun	130	20	70	180	30
1326A	NE NE 11-2S-10E	Edwards	90	20	80	130	30
1427	NE NE 28-7N-3E	Fayette	120	20	105	160	35
1350A	Truax Coal Corp. pit	Fulton	90	45	60	180	25
1355A	SE NW 30-12N-11W	Greene	110	15	100	90	50
1401	SW 11-33N-6E	Grundy	90	<15	75	90	25
1331A	SW SW 12-31N-8E	Grundy	110	20	70	100	35
1408	SW SW 26-3N-5W	Hancock	100	10	55	100	25
1324B	North. Ill. Coal Co. pit	Kankakee	110	20	80	140	40
1347A	SE 17-11N-2E	Knox	80	20	60	60	30
1324A	SW SW 5-33N-4E	LaSalle	170	20	120	190	40
1403	SW SW SW 9-33N-3E	LaSalle	170	20	100	90	40
1321A	SW SW 34-27N-8E	Livingston	80	15	50	70	20
1344A	SE SE NE 35-6N-10W	Madison	90	20	85	80	30
1400	SE NW 23-12N-9E	Marshall	100	<20	100	140	30
1325A	SE NE 12-5N-4W	McDonough	100	25	70	150	25
1330A	SW SE 11-18N-7W	Menard	90	20	100	170	35
1418	NW NE 32-7S-6W	Randolph	120	15	90	60	30
1308	NE NW 36-4S-5W	Randolph	100	20	110	250	35
1354A	SW SW SE 6-17N-5W	Rock Island	130	20	155	270	100
1327A	SE SE 21-9S-6E	Saline	100	<20	80	200	30
1332A	SW 1-15N-5W	Sangamon	100	20	110	270	40
1334A	NW NE 31-2N-8W	St. Clair	80	20	60	150	25

* Analyst: J. Witters, B, Cu, Mn, and Zr; N.F. Shimp, Co, Cr, Ga, Ni, Pb, and V

Estimated uncertainty:

B	± 10%	Mn	± 30%
Co	± 20% (1)	Ni	± 10%
Cr	± 30% (1)	Pb	± 30% (1)
Cu	X/2 (2)	V	± 10%
Ga	± 10%	Zr	± 20%

(1) Most values for these elements are close to the detection limit.

(2) X/2 near detection limit of 100 ppm.

of Clay Materials in Illinois*

million)

Mn	Ni	Pb	V	Zr	Unit	Age
100	20	65	80	280		Eocene
770	40	50	100	150	Orchard Creek	Silurian
1000	80	60	175	120		Pennsylvanian
780	70	120	145	110	Purington	Pennsylvanian
440	50	55	140	140	Purington	Pennsylvanian
420	35	40	100	180	Brereton	Pennsylvanian
220	40	70	160	290	Hannibal	Mississippian
680	40	85	100	200	Maquoketa	Ordovician
860	45	65	105	210		Pennsylvanian
690	65	125	150	130		Pennsylvanian
900	40	40	100	180	Canton	Pennsylvanian
650	50	70	160	110	Purington	Pennsylvanian
800	40	75	110	250	Francis Creek	Pennsylvanian
380	45	50	155	150	Underclay of No.7 Coal	Pennsylvanian
420	35	<40	120	140	Francis Creek	Pennsylvanian
500	51	80	120	170	Francis Creek	Pennsylvanian
390	45	100	95	180	Purington	Pennsylvanian
300	60	110	155	160	Francis Creek	Pennsylvanian
210	55	105	145	140	Francis Creek	Pennsylvanian
540	50	105	90	110	Wisconsin Till	Pleistocene
640	40	60	140	180	Purington	Pennsylvanian
550	65	<50	225	140	Underclay of No.7 Coal	Pennsylvanian
1000	65	50	110	190	Francis Creek	Pennsylvanian
730	50	65	125	140	Trivoli	Pennsylvanian
160	50	65	80	110	Waltersburg	Mississippian
590	60	70	125	150		Pennsylvanian
480	90	55	135	140	Tradewater	Pennsylvanian
900	45	50	115	140	Brereton	Pennsylvanian
850	45	50	125	180	Trivoli	Pennsylvanian
450	55	85	125	180		Pennsylvanian

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